

5

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JOURNAL

Contents

Volume 26, Number 1, March 1983

5 Some Tests of the Effectiveness and Functional Attributes of Miles and Snow's Strategic Types
Donald C. Hambrick

27 Organizational Policy and Innovation Among Suppliers to the Food Processing Sector
John E. Ettlie

45 Measures of Perrow's Work Unit Technology: An Empirical Assessment and a New Scale
Michael Withey, Richard L. Daft, and William H. Cooper

64 Mobility Influences During Managerial Career Stages
John F. Veiga

86 Career Lines and Employment Stability
Richard W. Scholl

104 The Cognitive Component in Locke's Theory of Goal Setting: Suggestive Evidence for a Causal Attribution Interpretation
Thomas I. Chacko and James C. McElroy

119 Attribution Theory and Strategic Decision Making: An Application to Coalition Formation
John A. Pearce II and Angelo S. DeNisi

129 The Relationship Among Perceptual Similarity, Sex, and Performance Ratings in Manager-Subordinate Dyads
Elaine D. Pulakos and Kenneth N. Wexley

140 Modeling the Policies of Several Labor Arbitrators
Joseph P. Cain and Michael J. Stahl

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148 The Relationship of Organization Structure and Interpersonal Attitudes to Role Conflict and Ambiguity in Different Work Environments
Peter J. Nicholson, Jr., and Swee C. Goh

156 Interdependence and Coordination in Organizations: A Role-System Analysis
Joseph L. C. Cheng

RESEARCH NOTES

163 Job and Life Satisfactions: A Causal Analysis of Their Relationships
Thomas I. Chacko

170 Managerial Work: The Influence of Hierarchical Level and Functional Specialty
Cynthia M. Pavett and Alan W. Lau

178 The Effects of Representatives' Power Within Their Own Organizations on the Outcome of a Negotiation
Conrad N. Jackson and Donald C. King

185 Is the Simultaneous Verbal Protocol a Viable Method for Studying Managerial Problem Solving and Decision Making?
David M. Schweiger

192 **ERRATUM**

193 **STYLE GUIDE**

195 **ANNOUNCEMENTS**

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Some Tests of the Effectiveness and Functional Attributes of Miles and Snow's Strategic Types[1]

DONALD C. HAMBRICK
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The Miles and Snow strategic typology is tested and extended. Based on a sample of businesses in the PIMS data base, the study explores the effectiveness of the strategic types in different environments and the ways in which defenders and prospectors differ in their functional attributes.

A strategy may be considered a pattern in a stream of decisions (past or intended) that (a) guides the organization's ongoing alignment with its environment and (b) shapes internal policies and procedures. Because of its multidimensional character and its situational tie to industry peculiarities, the strategy construct has eluded precise and common operationalization. However, a recent perspective for empirically viewing business-level strategies is available in the Miles and Snow (1978) typology (defenders, analyzers, prospectors). This study represents an attempt to test and extend the Miles and Snow typology along lines not fully explored by its originators. In particular, the paper addresses these broad questions:

How does the industry environment affect the effectiveness of Miles and Snow's different strategic types?

How do the strategic types differ in their functional tendencies?

Theoretical Background and Hypotheses

Organizational Strategy

In early organizational literature, strategy was viewed as a situational art in which the chief executive would craft a comprehensive plan of action

[1]Support for this research was received from the Strategy Research Center at Columbia University's Graduate School of Business and from the Strategic Planning Institute, Cambridge, Mass. Suggestions from John Anderson, Ricardo Barbosa, Per Borjesson, David Jemison, Ian MacMillan, William Newman, Sidney Schoeffler, Charles Snow and Michael Tushman were valuable in shaping and refining this study.

that matched environmental opportunities and threats, internal strengths and weaknesses, and managerial values (Andrews, 1971; Chandler, 1962). As the strategy concept received more systematic attention, some of its nuances came to light: the distinction between intended and realized strategy (Mintzberg, 1978); the temporal qualities of strategy (Miller & Friesen, 1980; Mintzberg, 1978; Peters, 1978; Snow & Hambrick, 1980) and the relationship between strategy and internal organizational features (Galbraith & Nathanson, 1978; Miles & Snow, 1978).

The distinction between corporate-level strategy (What businesses should the organization be in?) and business-level strategy (How should the organization compete in a given business?) is of key importance in doing empirical strategy research (Hofer & Schendel, 1978; Vancil, 1976). Despite the relatively ethereal tone of the corporate strategy question, it actually has been studied more heavily and systematically than has the business level question (as documented in Hofer, 1975). A major obstacle to research at the business level is that industries (and even subgroups within industries) have their own key environmental attributes and strategic options (Datta, 1979; Hambrick, 1979; Hatten, Schendel, & Cooper, 1978; Lenz, 1978; Schendel & Patton, 1978). Thus, generalizability across industries is difficult to achieve.

Miles and Snow Typology

The Miles and Snow typology (1978) is a recent, promising attempt to lend impetus to the study of business-level strategy. Based on field studies in four industries (college textbook publishing, electronics, food processing, and health care), Miles and Snow identified three recurring viable strategies. The key dimension underlying the typology is the rate at which an organization changes its products or markets. *Defenders* are organizations that engage in little or no new product/market development. Often they control relatively secure niches within their industries, competing primarily on the basis of price, quality, delivery, or service. *Prospectors* attempt to pioneer in product/market development. They tend to offer a frequently changing product line and compete primarily by stimulating and meeting new market opportunities. *Analyzers* are an intermediate type. They make fewer and slower product/market changes than do prospectors, and they are less committed to stability and efficiency than are defenders.

Miles and Snow examined interrelationships of various attributes—product/market entry behavior, technology, structure, managerial processes, and power distribution—within each strategic type. For example, they conclude that prospectors tend to have complex coordination and communication mechanisms, rely on participative and decentralized decision making, and to a great extent are shaped by the influence of marketing and product development executives. At the other extreme, defenders make substantial efforts toward rationalizing production and delivery of their goods and services, tend to have relatively simple coordination mechanisms, rely on

centralized decision making, and to a great extent are shaped by the influence of production and finance executives. As expected, analyzers have attributes that blend those of defenders and prospectors.

Over time, according to Miles and Snow, organizations following these strategies develop certain internal consistencies and tend to perpetuate the strategies. On the positive side, this means that an organization has a tested, well-developed set of response mechanisms for dealing with environmental shifts. On the negative side, it means that organizations have difficulty accepting the need for, or being able to implement, strategic change. Power patterns, values, and resources are all geared for the established strategy. Prospectors tend to want to continue prospecting; defenders tend to want to continue defending. Change requires a fundamental reshaping of the organization, its people, its asset mix, and its processes. Organizations that attempt ad hoc, opportunisitic deviations from their strategies, or that never develop a strategy with all its accompanying consistencies, will experience low performance and qualify as members of Miles and Snow's only low performing type—reactors.

It is important to note that the typology is aimed at explaining business-level phenomena. Its applicability for viewing corporate-level strategy is not clear, but it probably is very limited.

The typology has important strengths. It is parsimonious but appears to account for significant variations across organizations. It allows the strategy construct to be operationalized in other than industry-specific terms. The typology also has limitations. Its parsimony can be taken as an incomplete view of strategy. Its generic character ignores industry and environmental peculiarities. In fact, Miles and Snow (1978) and Snow and Hrebiniak (1980) stressed that the various strategic types would perform equally well in any industry, providing that the strategy was well implemented. This latter stance, which is inconsistent with the more typical view that an environment favors certain types of strategies, is a major focus of this study.

The typology appears to warrant more development and testing. As noted, little consideration of the environment-strategy link has been given. No systematic evidence has been provided on how the strategic types differ in their functional attributes (e.g., capital intensity, pricing policies), even though Miles and Snow argued for the importance of internal consistencies. Also, there is the broader concern that the apparent power of the typology rests on artificial evidence. After all, the typology resulted as a post hoc explanation of behavior in a sample of publishing firms. Subsequent studies of the typology have (a) assumed its validity and (b) relied on subjective assessment of strategies or accompanying variables, thus allowing ample attribution and attenuation by both researchers and respondents (studies by A. D. Meyer and H. J. Coleman as reported in Hambrick, 1979; Miles and Snow, 1978; Snow and Hrebiniak, 1980). Research methodologies and biases may have yielded the appearances of a more powerful typology than may in fact exist.

Strategy and the Environment

A key premise in the normative literature is that a strategy should favorably align the business with its environment (Andrews, 1971; Hofer & Schendel, 1978; Porter, 1980). That is, strategy is an adaptation mechanism. Miles and Snow take quite a different view. As already noted, they view strategy as relatively immutable. In their view, strategy *constrains* the organization in its responses to the environment. Over time, the business develops recurring, tested guidelines or mechanisms for responding to (or ignoring) environmental shifts.

Miles and Snow contended that each of their three strategies could be observed in any industry and that, if properly implemented, the three strategies (again, in any industry) would yield similar results. For them, the emphasis was on implementation and internal consistency among the various activities of the organization. In a later study, Snow and Hrebiniak (1980) attempted to test this theme in four industries. Their results generally were supportive but were limited by small sample sizes, subjective measurement of strategy, and unclear measures of performance.

As one thinks about the environment-strategy link, one must bear in mind that strategy is a *relative* phenomenon. A business-level strategy can be cogently discussed only relative to competitors' strategies. To rate a business on some absolute scale (e.g., capital intensity or advertising expenditures) is primarily to characterize the kind of industry it is in. This is an especially relevant issue with the Miles and Snow typology, because its parsimony allows concise measurement of attributes such as new product introduction. A useful example can be drawn from Lawrence and Lorsch's (1967) discussion of two dissimilar industries—standardized containers and plastics. The container industry was mature and commodity-like, and primary competitive requirements were for low prices and reliable delivery. No industry sales came from products introduced in the previous five years. In contrast, the plastics industry was in its growth stage and highly differentiable; its primary competitive requirements were for new products and new product applications. Of its industry sales, 15 percent were from recently introduced products. If new product sales were used to operationalize the Miles and Snow typology in a study of these industries combined, one might be tempted to give a prospector label to a firm with 10 percent of its sales from new products, and a defender label to a firm with only 2 percent of its sales from new products. However, if these were a plastics firm and a container firm, respectively, this would be a serious classification error. The two firms' new product sales are largely a function of the industries they are in. As for their strategies, which must be calculated in relative terms, it would be more accurate to label as defender-like the plastics firm which lags its industry in new product sales, and as prospector-like the container firm which surpasses its industry in new product sales.

This reasoning leads to two premises (which are too obvious to be considered hypotheses):

Premise 1: New product sales of a business are significantly associated with characteristics of the industry environment: product life cycle stage and industry product innovation.

Premise 2: Still, within most industries, competitors will vary in their emphasis on new products, thus allowing defenders and prospectors to be identified.

Having drawn a distinction between industry tendencies and strategy, Miles and Snow's overarching supposition about performance can be stated as a reasonable hypothesis:

Hypothesis 1: On average, prospectors and defenders have equal performance levels.

The robustness of this proposition will be tested in two ways. First, three different performance measures will be used:

Hypothesis 1a: On average, prospectors and defenders have equal performance levels, as measured by profitability, cash flow, and market share change.

Actually, Miles and Snow were not explicit about what constitutes "performance." Their descriptions of organizational performance tended to be anecdotal, yet not very specific. This is not to be taken as a shortcoming. Their work was exploratory, and the performance question was not at the center of their inquiry.

The three performance measures selected here are quite complementary. Profitability (return on investment) is the most conventional measure of current business performance. Cash flow indicates the extent to which the company currently is reaping more money than it is putting into the business. Market share change indicates the growth of the business and its fitness for the future. Conventional portfolio theory argues that it is difficult for a business to have high cash flow and market share growth at the same time (Henderson, 1979; Hofer & Schendel, 1978). More recent evidence indicates that the tradeoffs among profits, cash flow, and share growth may not be severe and that these goals often can be achieved in tandem (Hambrick, MacMillan, & Day, 1982).

All three performance measures are prominent in the literature, and they can be considered valid measures for testing Miles and Snow's contention that prospectors and defenders perform equally. A reasonable rival hypothesis, of course, is that prospectors perform better than defenders on some measures (e.g., market share growth) and worse on others (e.g., cash flow).

The second way of testing the robustness of the Miles and Snow contention is through this proposition:

Hypothesis 1b: Hypothesis 1a will be confirmed regardless of key industry characteristics such as life cycle stage and new product innovation rates.

This proposition argues, as do Miles and Snow, that the strategic types are equally viable in any industry. According to this view, a defender in a mature, noninnovative industry can perform well because its strategy is consistent with the environmental requirement for efficiency and low prices.

And a prospector in the same industry can do well because it is serving a market segment that seeks new or different variations of the product—a segment that most competitors are not inclined or equipped to serve. Similarly, it is argued that both defenders and prospectors can perform well in a growing, innovative industry. Again, for Miles and Snow, the issue is not "Which strategy is best for this environment?" but, rather, "How do we fully implement this strategy?"

Product life cycle stage and industry innovation were chosen as the two environmental variables because of their importance in the strategy literature and their conceptual tie to the strategy measure used here (Hambrick, 1981; Hofer, 1975). Life cycle stages and industry innovation rates can be expected to be correlated but not redundant (a conjecture to be tested).

These propositions do not specify fully the range of possible linkages between Miles and Snow's strategic types and organizational performance. However, they represent the first systematic inquiry into those linkages and should advance understanding of the strengths and limitations of the typology.

Strategy and Functional Attributes

A strategy not only guides the organization's alignment with its environment. It also is presumed to shape the organization's internal features—functional policies, distinctive competencies, structure, and processes. Miles and Snow focused primarily on documenting the structures and managerial processes that tend to accompany their three types. They only surmised about the functional (production, marketing, etc.) policies that might accompany each strategy. For example, defenders would engage in relatively great vertical integration in an attempt to obtain stable, inexpensive sources of raw materials. They also discussed, anecdotally, the possible competitive devices that would be employed under each strategy. For example, defenders would tend to compete on price, quality, and service. They also discovered apparent tendencies for the strategic types to develop different distinctive competencies, that is, capabilities their competitors do not have. Their impressions of different distinctive competencies were later tested (Snow & Hrebiniak, 1980), indicating that defenders particularly excel in production and applied engineering and prospectors are strong at product research and development and basic engineering. There is a need to extend these findings, because they are based on subjective scales and because they still leave open the question of how defenders and prospectors differ in their actual functional attributes.

The development of hypotheses here relies on a categorization of top management tasks presented by Miles and Snow (1978). The entrepreneurial task involves domain selection and adjustment; the engineering task involves throughput processing; the administrative task involves the establishment of roles and relationships. The strategic types differ in how they handle the three tasks, but, most notably, prospectors devote themselves to the

entrepreneurial task and defenders attend primarily to the engineering task. There will be no further consideration of the administrative task here. Miles and Snow extensively documented how the strategic types differ in their structures and processes.

Entrepreneurial Task. As noted, one would expect prospectors to devote themselves to the entrepreneurial problem. They tend to monitor product/market trends closely, devote a great deal of resources to new product development, and support their continuing initiatives with relatively heavy marketing expenditures, since both the sales force and the consumer are in constant need of reinitiation and reeducation. Accordingly, the following hypotheses can be set forth:

H2a: Prospectors spend more on product R&D, as a percentage of sales, than do defenders.

H2b: Prospectors have higher marketing expenses (sales force, promotion, and marketing administration), as a percentage of sales, than do defenders.

H2c: Prospectors are more vertically integrated forward than are defenders.

This last hypothesis may seem inconsistent with the prospector's need for flexibility, but the assumption is that prospectors find that in-house channels can be motivated, educated, and controlled to an extent that outside channels cannot. In light of the continuing reeducation problem that prospectors face, this feature would seem important. It also can be argued that prospectors require superior market intelligence, available only from in-house channels.

Engineering Task. Defenders devote themselves to the engineering task. As such, one would assume that, relative to prospectors, they tend to use their resources very efficiently, and they work to improve even further their potential for efficiency. Accordingly, the following hypotheses can be set forth:

H3a: Defenders have a greater fixed asset intensity than do prospectors.

H3b: Defenders are more vertically integrated backward than are prospectors.

H3c: Defenders have greater value added per employee than do prospectors.

H3d: Defenders have greater capacity utilization than do prospectors.

H3e: Defenders have lower average compensation rates than do prospectors.

H3f: Defenders have lower overall direct costs than do prospectors.

H3g: Defenders spend a greater portion of their total R&D expenditures on process improvements than do prospectors.

Competitive Devices. As Miles and Snow surmised, one would expect defenders to compete along those lines favorable to a business that concentrates its energies on an unchanging domain. Specifically:

H4a: Defenders have lower prices than do prospectors.
H4b: Defenders provide better service than do prospectors.
H4c: Defenders provide better quality than do prospectors.

With regard to this last hypothesis, it should be noted that Miles and Snow said that defenders gain quality by refining their existing products. They did not consider the possibility that prospectors' new products could be taken as "improvements" (in quality) on their old products, or on those of the defenders in the industry. Thus conviction in H4c is equivocal.

Methodology

PIMS Data Base

The data used in this study were drawn from the Profit Impact of Market Strategies (PIMS) project, an ongoing, large scale statistical study of environmental, strategic, and performance variables for individual business units. About 200 corporations submit data annually on a total of about 2,000 of their business units. Each business—often a division—is a distinct product-market unit. (For a technical summary of the PIMS data base, see Schoeffler, 1977).

Anderson and Paine (1978) provided a comprehensive critical view of the PIMS data base. Most of their concerns were about the ways in which PIMS data had been statistically analyzed and presented in previous studies. They raised limited concerns about the quality of the data, but more generally acknowledged the data base to be of high quality and reliability. Two factors that previous critics have not noted especially commend the data. First, PIMS staffers help each business interpret and answer the questions, thus assuring a relatively high degree of data comparability. Second, each company pays a substantial sum to participate in PIMS, and the company's ability to derive meaningful conclusions from the software is particularly a function of the accuracy of its own data. The businesses appear to have a commitment to thoroughness and accuracy that is missing in most questionnaire studies. Despite considerable confidence in the data base, it has limitations, including those noted by Anderson and Paine (1978).

The present study used the last four years' PIMS data on businesses in the growth and maturity stages of the life cycle, of which there were 1,452. Sample sizes in the introductory and decline stages of the life cycle were too small to allow meaningful analysis. Four-year averages were used throughout.

Variables and Measures

The variables and measures used in this study are presented by conceptual category.

Environment. Two environmental variables were included in the study: product life cycle stage and industry new product innovation. The

environments of the businesses were categorized according to these definitions (as reported by the respondents):

Growth industry:	Demand growing at 10 percent or more annually in real terms; technology or competitive structure still changing.
Mature industry:	Products or services familiar to vast majority of prospective users; technology and competitive structure reasonably stable.
Noninnovative industry:	Less than 1 percent of the revenues of the three largest competitors (excluding the focal business) are derived from products introduced in the last three years.
Innovative industry:	More than 5 percent of the revenues of the three largest competitors are derived from products introduced in the last three years.

Industries with moderate innovation scores (i.e., 1 percent to 5 percent) were excluded from the analysis. The dividing lines for industry innovation were chosen so as to capture roughly the bottom 40 percent and top 40 percent of PIMS businesses on this variable (median = 3; mean = 10). It may be useful, for reference, to point out how the three industries studied by Lawrence and Lorsch (1967) would fit in this classification of industry innovation. The plastics industry (15 percent of sales from products introduced in the previous five years) clearly would rate as innovative; the packaged food industry (5 percent of sales from products introduced in the past five years—longer than the 3-year period used here) would fit in the moderate innovation category, which was dropped; the standardized container industry (zero sales from new products) clearly would qualify as noninnovative. The well known contrasts between these industries, as analyzed by Lawrence and Lorsch, lend some validity both to the choice of measure and to the choice of cutpoints for classifying industry innovation.

Product life cycle and industry innovation are correlated, but by no means redundant, as indicated by the samples portrayed in Table 1. The sample reflects the general preponderance of mature businesses in the PIMS data base.

Market Share. Because market share has been shown to have a strong association with profitability (Buzzell, Gale, & Sultan, 1975), it was included

Table 1
Sample Sizes in Four Environments

Environment	*n*
Growth—Noninnovative	87
Growth—Innovative	221
Mature—Noninnovative	504
Mature—Innovative	418

as a situational variable in the analyses of performance of different strategies. Market share was treated as a categorical variable, to retain consistency with the other variables being examined:

Share leader: A business with more market share than any other competitor.

Share follower: A business that does not have the leading share position.

This classification coincides with that used most commonly for dividing high share and low share businesses when using the widely cited Boston Consulting Group (BCG) product portfolio analysis (Lorange, 1979).

Strategy. Consistent with the earlier conceptual definition, Miles and Snow's strategic types were operationalized according to *actions relative to the competition.* The classifying variable was the percent of sales derived from new products for this business minus the percent of sales derived from new products for the three largest competitors. The overall mean for this relative new product activity measure is 0, and the standard deviation is 7. Defenders and prospectors were identified as follows:

Defender: A business whose relative new product activity is −5 or less (except in an industry in which industry innovation is 0, in which case a business with a relatively new product activity of 0—the lowest possible—is classified as a defender).

Prospector: A business whose relative new product activity is +5 or more.

Here, too, businesses with moderate new product scores—which might be called analyzers—were excluded, because this is primarily an attempt to test in an exploratory way the tendencies of extreme strategies. The cutpoints for classifying defenders and prospectors were the most extreme possible without resulting in sharply reduced sample sizes—especially of prospectors. Table 2 reports sample sizes by strategy.

Table 2
Sample Sizes of Prospectors and Defenders in the Different Environments

	Strategy	
Environment	*Defender*	*Prospector*
Growth—Noninnovative	59	25
Growth—Innovative	53	66
Mature—Noninnovative	425	31
Mature—Innovative	112	79
Total	649	201

Two other variables in the data base, relative product line breadth and relative customer breadth, have a conceptual association with the prospecting construct. However, they are measured on 3-point ordinal scales with insufficient discriminating power to be useful in categorizing the businesses. It should be noted that attempts to combine the three measures into a comprehensive prospecting index were dropped due to nil correlations among the

three variables. This calls into question the extent to which prospecting is a unitary construct, as Miles and Snow have suggested. Rather, new products, new customer types, new geographic markets, and product line breadth may represent different types of prospecting activity, which, in turn, call for different accompanying characteristics.

The strategy measure used was less than ideal in two respects. First, it would have been preferable to have multiple indicators for identifying defenders and prospectors. Second, the cutpoints were not extreme in absolute terms; hence more valid (but also more cumbersome) labels might be "defender-like" and "prospector-like."

A different, more extreme strategy classification process was used to examine the differences in functional attributes of defenders and prospectors. In this part of the study it seemed especially important to control for industry peculiarities. Thus, the approach was to identify matched pairs of defenders and prospectors in the same 4-digit SIC codes. A defender was defined as a business whose new product sales were *below 1 percent for all four years.* A prospector was defined as a business whose new product sales were *above 10 percent for all four years.* A total of 74 matched pairs of businesses pursuing these extreme, persistent strategies were identified.

Matching these businesses along 4-digit SIC codes in no way assures that the pairs were operating in the same market segments or that they were direct competitors. However, the 4-digit level equates with the level of aggregation used in developing the typology (Miles & Snow, 1978) and with the explicit use of 4-digit industry analysis in extending the typology (Snow & Hrebiniak, 1980). The 4-digit level assures some comparability of technology, life cycle of the product category, general level of capital intensity, and so on.

Performance and Functional Variables. The performance and functional variables examined in the study appear in Tables 4 and 5. Definitions can be obtained from the author. Two of the performance measures—Return on Investment (ROI) and Cash Flow on Investment (CFOI)—suffer the limitations of any accounting measure: varying depreciation, inventory, and lease valuation methods. The use of 4-year averages helps minimize this problem.

Data Analysis

Univariate *t*-tests and multivariate regressions (with dummy variables) were conducted to test for differences in performance of prospectors and defenders in different environments. The nonparametric sign test was used to determine differences in functional attributes between the matched samples of defenders and prospectors.

Table 3
Performance of Prospectors and Defenders in Different Environments[a]

Performance of Environment	*Profitability (ROI)*					*Cash Flow (CFOI)*					*Market Share (MSC)*				
	Defender		*Prospector*		*Sig.*[b]	*Defender*		*Prospector*		*Sig.*[b]	*Defender*		*Prospector*		*Sig.*[b]
Growth—Noninnovative	28.4	(25.0)	16.0	(29.4)	*	-.65	(18.91)	-8.23	(20.96)	*	.90	(2.64)	.63	(2.58)	
Growth—Innovative	26.8	(24.5)	17.6	(21.8)	**	1.31	(17.60)	-4.57	(15.15)	**	-.51	(2.34)	1.04	(1.97)	***
Mature—Noninnovative	22.8	(22.6)	13.4	(22.6)	**	4.74	(15.01)	-2.13	(15.77)	***	.12	(1.76)	.05	(2.28)	
Mature—Innovative	21.1	(23.6)	18.3	(20.2)		6.51	(15.53)	-3.32	(16.04)	***	.27	(2.01)	.83	(2.00)	***
Overall	23.3	(23.5)	17.1	(22.8)	**	4.27	(15.89)	-4.27	(16.20)	***	.07	(1.98)	.76	(2.13)	***

[a]Means reported with standard deviations in parentheses.
[b]Significance of difference using t-test: *$p < .10$, **$p < .05$, ***$p < .01$.

Results and Discussion

Strategy and Performance

Results. Contrary to Hypothesis 1 (and its variations), there were significant differences in the performance of prospectors and defenders, depending both on the environment and on the performance measure examined. These findings are examined by first reporting results of the straightforward *t* tests, and then the multivariate regressions.

Table 3 indicates that the defenders had significantly higher ROIs than did the prospectors. This was true overall and for each environment except the mature-innovative environment, for which the difference was nearly significant. Defenders also had higher CFOIs, on average, than did prospectors. The disparity was significant for the overall sample and within each environment.

As for market share change, the patterns were more selective. In the two noninnovative environments, there were no differences between prospectors and defenders. In the two innovative environments, however, prospectors had significantly higher gains in market share than did defenders. The differences within the innovative environments were great enough to cause a significant difference for the overall sample.

On the basis of these results, it appears that defenders consistently outperform prospectors on ROI and CFOI, but prospectors outperform defenders on market share change in innovative industries.

Table 4
Regressions of Situational and Strategic Variables on Three Performance Measures (Standardized Betas Reported)

	Performance Measures		
Independent Variables	*Return on Investment*	*Cash Flow on Investment*	*Market Share Change*
Situational			
Mature industry	.00	.12***	−.06**
Noninnovative industry	.03	.02	.02
Share leader	.28***	.24***	−.07***
Strategy			
Defender	−.02	−.02	.01
Prospector	−.06**	−.08***	−.01
Strategy within environments			
Defender in growth—noninnovative	.01	.01	.01
Defender in growth—innovative	.01	.01	−.09***
Defender in mature—noninnovative	−.05**	−.04*	−.02
Defender in mature—innovative	−.02	.01	−.05**
Prospector in growth—noninnovative	−.03	−.02	.01
Prospector in growth—innovative	.00	.02	.05**
Prospector in mature—noninnovative	−.04*	−.04*	−.01
Prospector in mature—innovative	−.01	−.02	.06**
R^2	.10	.13	.04

*$p < .10$
**$p < .05$
***$p < .01$

The regression results (Table 4) generally corroborate and amplify the above results. The R^2s were not high; however, this should not be taken as a detraction. The aim was not to develop a strong model for predicting performance, but rather to use regression as a data analytic technique for testing selected relationships (Cohen, 1968). The approach here will be to discuss the ROI and CFOI regressions (because these two measures are somewhat similar—$r = .59$) and then to discuss the market share change regression.

The situational variables were prominent in the ROI and CFOI regression results. Consistent with previous PIMS findings (Buzzell et al., 1975; Hambrick et al., 1982), market share was strongly associated with ROI and CFOI. This is not a new finding and need not be discussed in any detail.

A mature industry (dummy variable; base case = growth industry) was positively associated with cash flow. This is a cornerstone of the logic behind the BCG's product portfolio matrix (Henderson, 1979). In a mature industry, businesses typically do not engage in major capacity expansions and inventory buildups that dampen cash flow for businesses in growth industries. This finding, using PIMS data, has been explored in greater detail in Gale and Branch (1981) and Hambrick et al. (1982).

Turning to the strategy variables, it is seen that being a prospector (dummy variable; base case = analyzer) was negatively associated with both ROI and CFOI). This finding mirrors the results of the *t*-tests presented earlier. Being a defender was also slightly (not significantly) negatively associated with ROI and CFOI. The betas for defenders and prospectors were significantly different ($p < .05$) in the CFOI regression, but not in the ROI regression. These results suggest that in general the "superior" strategy was neither of the two extreme strategies. It was the base case strategy—that is, analyzer.

This latter conclusion was supported by the coefficients for strategies within specific environments. In particular, in a mature-noninnovative environment, both prospecting and defending were negatively associated with ROI and CFOI. Statistically speaking, the analyzer strategy was the superior strategy in such an industry. (For the sake of space and simplicity in reporting, results for analyzers were not examined with *t*-tests.) In light of the apparent dominance of analyzers in mature-noninnovative industries (suggested by the regressions), it is appropriate to specify how well they performed. Mean ROIs in that environment were as follows: defenders = 23 percent, analyzers = 31 percent, prospectors = 13 percent.

The use of the analyzer strategy as the base case in the regressions yields less direct tests of the hypotheses than if defenders and prospectors were directly compared to each other. The advantage is the opportunity to identify such quasicurvilinear patterns as appeared—that defending and prospecting were both inferior to the more moderate analyzer strategy. There were more than 50 analyzers in each environment, except the growth–noninnovative. Because multicollinearity could be a problem in the latter case, the regressions were run with and without the defender dummy in the growth-noninnovative cell, with no differences appearing.

No other significant findings emerged in examining the effects of ROI or CFOI of strategies in particular environments.

The regression on market share change (MSC) yielded significant patterns. The situational variables were among those of note. A mature industry was negatively associated with MSC. This reflects both the relatively entrenched competitive positions in mature industries and the typical missions of mature businesses to seek cash rather than market share (Henderson, 1979). Market share leadership was negatively associated with MSC. This finding may be due partly to mathematical limits: share leaders have the least potential for further increasing their shares. It also may be strategic: share leaders follow Bloom and Kotler's (1975) advice of avoiding further share increase so as to minimize pressure from external regulatory forces.

The effects of different strategies on MSC, as observed in the regression results, were quite consistent with those observed in the *t*-tests: namely, strategy alone was not a significant predictor of MSC. However, in both innovative environments, prospecting was positively associated and defending was negatively associated with MSC. (One may be tempted to argue that the positive beta for prospectors and the negative beta for defenders are tautological, due to arithmetic effects. This, of course, is not the case because, again, the analyzer strategy was the base condition for the dummy strategy variables. Thus, prospectors and defenders were statistically "compared" to analyzers, rather than to each other.)

In summary, the regressions indicated that being a prospector hurt ROI and CFOI in general; being either a prospector or a defender (instead of a more moderate analyzer) hurt ROI and CFOI in mature noninnovative industries; being a prospector helped and being a defender hurt MSC in innovative industries.

Discussion. Prospecting was negatively associated with ROI and CFOI in every type of environment examined. The development, production, and marketing of new products is expensive. Plants and equipment must be modified, new supplier arrangements often must be established, inventories must be built, sales forces and distributors must be educated to the new products, and so on. Stinchcombe (1965) summed the impact of these costs in his term, "the liability of newness." Even though some organizations may become very adept at managing continual change, as Miles and Snow (1978) have argued of prospectors, such organizations cannot prosper financially unless their markets continually seek new products. Only in such a situation are the defender and analyzer kept from exploiting their efficiencies and thus offering the product at a lower price than the prospector can afford. One would suspect that very few industries exist in which the call is for constant innovation. Thus, one can surmise that the prospector strategy, in its purest form, is relatively uncommon, relatively temporary, or an accurate portrayal of only very small-share "design boutiques."

The advantages of the prospector strategy might be clearer if one assumed the strategy to be temporary. Such a model fits with much of the strategy literature, in which short term financial sacrifices are made in a period of growth or rapid technological change, in order to build a strong future position from which cash and profits can be reaped (Henderson, 1979; Hofer &

Schendel, 1978). According to Miles and Snow (1978), however, strategies tend to be enduring. Managerial values, attitudes, and resources become more and more geared to the existing strategy such that changes are rare and painful. If so, then the prospector strategy cannot be seen as a "positioning" strategy (aside from the equivocal success the strategy meets in gaining market share—to be discussed below). The merit of the strategy is cast all the more into doubt.

The competitive disadvantages of prospecting have been discussed, but the business risks have not been directly addressed. The prospector strategy is chancier than an analyzer or defender strategy, because the business is betting on products and markets that are not yet crystallized (Biggadike, 1979). No doubt part of the ROI and CFOI penalty on prospectors seen here stems from failures of entire initiatives, in excess of any such failures by defenders or analyzers.

In mature noninnovative industries, the defender and prospector strategies both had lower ROI/CFOIs than did analyzers (as judged by the regression analyses). In these somewhat stagnant industries, the moderate strategy appears optimal. Presumably, the prospectors do poorly for reasons already noted: excessive costs, inability to compete in stable conditions, and failures associated with new products. For the defenders, poor performance may be due to heavy price competition. Of the four environments examined, the mature noninnovative environment is most commodity-like and most susceptible to intense price competition (Porter, 1980). Perhaps the defender, who has no new products, must join in the intense price competition. The analyzer, with modest amounts of new products, may be partly buffered from the sole emphasis on price. Another interpretation is that the even modest innovation undertaken by the analyzer in this stagnant type of industry is a reflection of the business's commitment to compete through differentiation, in general, rather than through price. Selective introduction of new products may join forces with reliable delivery, creative credit policies, and other tactics to remove the business from straight price competition (Levitt, 1980).

In innovative industries, prospectors outgained defenders in market share. Here there finally is evidence of a payoff for prospectors. If a market readily accepts new products (hence qualifying the industry as "innovative"), then a prospector can gain share, at the expense of defenders. This is true whether the industry is growing and innovative (personal computers) or whether it is mature and innovative (carpeting). The "mainstream" strategy of meeting the environment's requirement for innovation meets with share growth, on average. The "cross-current" strategy of ignoring the environment's requirement for innovation meets with share decline, on average. It is important to note that prospecting does not help market share in noninnovative industries.

It can be asked, "Is market share a worthwhile goal?" The logic of Henderson (1979) has already been noted: Build market share early in the life cycle, set prices at discouragingly low levels, and reap handsome profits

during maturity. Also, the findings of the PIMS program strongly suggest an association between profits and market share (Schoeffler, Buzzell, & Heany, 1974).

Recently the presumed causal association between market share and profits has been the object of close scrutiny. Rumelt and Wensley (1981) argued that attributing cause and effect to market share and profitability is akin to saying that people desiring expensive cars should live in expensive houses. There is a correlation but perhaps no causality. The heart of Rumelt and Wensley's argument rests on their contention that market share, as a "factor input" itself, theoretically should cost every bit of what it is worth. That is, *there is an informed and efficient market for market share* in an industry. This argument will gain plausibility over time, as executives come to understand better the associative nature of share and profits and to attach correct values to share-points. Certainly, the evidence in this paper suggests that share-builders in innovative industries, that is, prospectors, suffer ROI disadvantages in the current term. Because the study did not look at ROI changes, no conclusions can be drawn about the direct tradeoffs between profitability and share-building. However, prospectors appear to be "paying" for whatever share they may be gaining. (Unfortunately, prospectors tend to pay whether they are gaining share or not.) Whether they recoup these lost profits at a later time, given the high time-value of money today, is open to serious question.

In sum, Miles and Snow's (1978) supposition that prospectors and defenders perform equally was not borne out by this study. Prospectors appear to be at a general ROI/CFOI disadvantage in every type of environment, but they are at an advantage in gaining market share in innovative industries. Future consideration of the typology should rest on the assumption that the effectiveness of the various strategic types depends on the nature of the environment and the measure of performance sought—common premises in the strategy literature.

Strategy and Functional Attributes

The second set of hypotheses was aimed at exploring differences in the functional attributes of prospectors and defenders. Table 5 reports the results, indicating scattered support for the hypothesized differences.

Among the entrepreneurial attributes, two differed significantly, as hypothesized: product R&D/sales and marketing expenses/sales were greater for prospectors than for defenders.

These differences reinforce the image of prospectors as organizations that attend closely to the output task. In this study, prospectors were identified according to their *current* new product sales. Their relatively high product R&D expenditures suggest that they devote more resources than do defenders toward developing even more new products, which, in turn, supports Miles and Snow's portrayal of strategies as self-perpetuating. Prospectors also tend to devote more resources toward motivating, informing, and educating

P, 7464

Table 5
Functional Attributes of Prospectors and Defenders (74 Matched Pairs)[a]

	D/P[b]	Sig.[c]	Defenders (N = 74) mean	Defenders (N = 74) s.d.	Prospectors (N = 74) mean	Prospectors (N = 74) s.d.
Entrepreneurial attributes						
Product R&D/sales	14/60	***(H)	1.52	2.01	2.72	2.69
Marketing expenses/sales	36/48	**(H)	8.23	7.03	10.03	7.98
Relative integration forward	45/29	*(R)	2.03	.60	1.89	.59
Engineering attributes						
Gross fixed assets/employee	48/26	**(H)	39.13	45.04	31.61	40.73
Relative integration backward	38/36		1.93	.52	1.86	.58
Relative compensation rates	49/27	**(R)	101.30	5.55	99.01	5.69
Relative direct costs	28/46	*(H)	100.80	7.56	102.80	7.10
Process R&D/total R&D	38/36		.27	.28	.25	.29
Value added/employee	47/27	*(H)	35.87	21.07	30.60	19.67
Capacity utilization	37/37		73.78	16.19	72.76	17.38
Competitive devices						
Relative price	40/34		103.80	6.61	103.20	5.57
Relative service	47/27	*(H)	3.72	.89	3.40	.97
Relative quality	39/35		23.68	28.43	26.35	28.99

[a]Means and standard deviations are reported to aid interpretation only. They were not the basis of the significance tests. H = as hypothesized; R = reverse.

[b]D/P indicates the number of matched pairs in which the defender (D) had the higher score on the variable, and the number in which the prospector (P) had the higher score. This ratio forms the basis for the nonparametric test of significance.

[c]Significance of difference, using pairwise nonparametric sign test as follows:
*$p < .10$
**$p < .05$
***$p < .01$

their sales forces and customers. Although supporting data are not on hand, one would suppose that prospectors' sales forces are more sophisticated and better compensated than are defenders' sales forces. This is not to say that defenders are weak in the sales function. As with other functions, defenders conduct the sales function in a tested, efficient manner.

Forward integration differed in the opposite direction of what was hypothesized: namely, defenders were more integrated forward than were prospectors. Apparently, instead of the suggested model of prospectors' attempting to reach forward to control channels and to secure reliable market intelligence, the operative model is one of defenders' tending to handle their own selling, warehousing, and distribution because they probably anticipate few changes in their domains. Prospectors, on the other hand, are reluctant to become entrenched in forward stages because their offerings are always under reconsideration.

Among the engineering attributes, three of the hypothesized differences appeared. Defenders had higher gross assets/employee, higher value added/employee, and lower direct costs than did prospectors. These findings provide some support for the contention that defenders tend to be more automated and efficient than prospectors. Otherwise, the hypothesized "efficiency" orientation of defenders was not observed. Defenders and

prospectors did not differ significantly in backward integration, process R&D expenditures, or capacity utilization.

As for backward integration, it could be argued that defenders and prospectors are equal in their reliance on certain raw materials and differ primarily in their propensity to alter the transformation of those raw materials. Thus, prospectors may have no less cause to be integrated backward than do defenders.

As for process R&D, it could be argued that prospectors, who frequently revise their products, create the "opportunity" or necessity also to revise their production processes, which is enough to compensate for the defender's presumed greater inherent interest in refining the throughput process. This argument is supported by the moderate positive correlation ($r = .20$) between product R&D/sales and process R&D/sales for all businesses in the PIMS data base.

With regard to capacity utilization, it appears that, even though prospectors tend to have more flexible, labor-intensive capacity configurations than do defenders, they operate at the same general utilization levels as defenders (around 73 percent to 74 percent). If PIMS data were available for a sufficient time span, it is possible that one would observe greater variability (over time) in capacity utilization among prospectors than among defenders.

It was hypothesized that compensation rates for defenders would be lower than for prospectors. The rationale was that the relatively routine production process would allow the use of less skilled, less flexible workers than prospectors would tend to use. The results point significantly to the opposite pattern. Prospectors have lower average compensation rates than do defenders. Perhaps defenders have to compensate workers for the monotony of their tasks, but prospectors provide novelty and change as part of the overall compensation for their workers. This line of reasoning is supported by the (nonhypothesized) differences in average employee unionization levels of prospectors (40 percent) and defenders (51 percent) (significant at .02). Apparently, defending, unionization, and high compensation rates go hand in hand. The longitudinal question of sequence remains for future study.

Among the competitive devices examined, only service differed between prospectors and defenders. As hypothesized, defenders offered better average service than did prospectors.

Miles and Snow's speculation that defenders offer better quality was not confirmed. Perhaps, the quality that can come from defending is offset by the quality that can come from new product variations. There are various types of quality. Perhaps whether quality tends to be attached to defenders' offerings (as in private liberal arts colleges) or to prospectors' offerings (as in minicomputers) is a function of industry attributes not yet fully specified. Presumably, in market sectors in which reliability or brand image are key quality factors, defenders will have relatively great quality. In those sectors in which new functions/features or styling are key quality

considerations for the consumer, prospectors may be perceived as having high quality.

Paradoxically, prospectors did not indicate having higher relative prices than defenders. This stands in contrast to the significantly higher direct costs of prospectors (noted above). However, this finding is consistent with the advice of the BCG that businesses should price new products aggressively in order to capture market share. Perhaps prospectors are making current pricing sacrifices in order to heighten later cash flow or profitability. As observed in the earlier results, prospectors suffer in terms of current cash flow and profitability (no doubt due in part to the combination of high costs and moderate prices seen here). And only in innovative industries do prospectors gain more market share than do defenders. BCG's advice seems to have selective applicability and needs to be tested with appropriate discounting of delayed, uncertain returns.

Several functional differences between defenders and prospectors were observed, generally in line with what Miles and Snow would have hypothesized. But remaining unknown is whether the Miles and Snow continuum (product innovation) is the strongest or most pervasive strategic determinant of functional characteristics. Would some other dimension (e.g., relative capital intensity of relative employee productivity) be a more powerful "root dimension" on which to consider strategies? Fishing for alternative classification schemes was avoided in this study. The study was intended primarily as a test of the Miles and Snow typology rather than an attempt to search for a different typology, and relatively few PIMS variables are expressed in terms relative to competition. A search for causal networks of functional attributes will be an important avenue of future strategy research, but it most likely will require time series data.

Summary

This study attempted to extend the Miles and Snow typology in two directions. First, it examined the performance tendencies of prospectors and defenders in different environments. Contrary to Miles and Snow's (1978) supposition and to Snow and Hrebiniak's (1980) findings, which were based on impressionistic measurement of strategy, the present study found that defenders and prospectors differed in their performance tendencies, depending on the nature of the environment and the performance measure used. Specifically, in every type of environment examined, defenders outperformed prospectors in terms of current profitability and cash flow. The costs and risks of product innovation appear significant. Prospectors outperformed defenders in terms of market share gains, but only in innovative industries. In such industries, prospectors are rewarded for their adaptive stance. In noninnovative industries, prospectors are engaging in "unnecessary" adaptation, thus receiving no market share reward while incurring low profits and cash flows.

The question of whether it is better to be a defender or prospector should not be viewed with ambivalence, nor should it be viewed strictly as a function of distinctive competence (Snow & Hrebiniak, 1980). This study supports a general contention of strategy scholars: Choice of strategy should be a function of the requirements of the environment and the type of performance being sought at the time. In this way, the Miles and Snow typology potentially can be better linked to the widely discussed product portfolio matrices (Henderson, 1979).

The second aim of the study was to explore the functional attributes of prospectors and defenders. In general, the hypothesized entrepreneurial orientation of prospectors was observed (high product R&D expenses and marketing expenses). And, in general, the hypothesized efficiency orientation of defenders was observed (high capital intensity, high employee productivity, low direct costs). The paper attempts to explain why the other hypothesized differences were not observed. On balance, the study provides an expanded image of the functional profiles of defenders and prospectors. These expanded portrayals, when linked to those offered by Miles and Snow, and Snow and Hrebiniak, should allow future researchers to use the typology to study more cogently the prescriptive questions about how environment, strategy, and functional attributes should align in order to yield different types of performance.

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Organizational Policy and Innovation Among Suppliers to the Food Processing Sector[1]

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In this study a model of the organizational innovation process, whereby context causes policy, which causes innovation, was tested and generally supported by data from 54 equipment and packaging suppliers to the food processing industry. Increasing organization size up to a point and an aggressive technology policy emerge as the two key variables in this model of organization and innovation.

It has long been recognized that the innovation process involves the interlocking actions of diverse organizations, institutions, and people. Especially when major technological innovation is being proposed, initiated, adopted, and implemented, no one person or organization is likely to be able to take full credit for varying degrees of success or failure. In particular, the relationship between suppliers and customers in any goods-producing or service sector has been the focus of much of the inquiry into the multi-organization approach to innovation (Abernathy & Townsend, 1975).

In this study of the innovation process, the focus is on the suppliers of one of the largest and oldest of industries, the food sector. For the purposes of this analysis, these suppliers of food packaging and equipment to food processing firms are assumed to account for much of the innovation that eventually increases the productivity of food companies (Mueller, Culbertson, & Peckham, 1979). How does innovation occur in this industry? What is the role of suppliers in the innovation process? What is the nature

[1]Work in this area was supported by the National Science Foundation, Division of Industrial Science and Technological Innovation, under Grant No. PRA-7914354. The views contained herein are those of the author and do not necessarily reflect the official position of the National Science Foundation. Data were collected during this project, in part, by means of a subcontract with the Survey Research Laboratory, University of Illinois, Francis Fullam, project coordinator. Design of the study and research instruments was accomplished with the help of William P. Bridges and Robert D. O'Keefe. Research assistants on the project were Lynne Doubleday and Aun Saboowala. The author gratefully acknowledges helpful comments on this paper from Jane Dutton, Kellogg Graduate School of Management, Northwestern University. The comments of three anonymous reviewers are greatly appreciated. Additional support on this project was provided by DePaul University.

of the innovation process among suppliers of the food industry? These are the questions that are the primary focus of this study.

In order to be most useful and generalizable, an industry focus must attend to the theoretical concerns of this research area. In particular, four lingering issues appear to be central to any theory of organizational innovation. These issues need resolution and integration regardless of thematic approach. First, what is the stimulus or motivation for innovation? Performance gap theories appear to be the most frequently discussed in this regard. Second, how does one reconcile the apparent contradictions in the literature concerning the relative importance of market stimulus (Utterback, 1974; Von Hipple, 1976) versus technological opportunity or push (Mowery & Rosenberg, 1979; Utterback & Abernathy, 1975) within the context of the performance gap theories? The question that remains is how the need to close a performance gap is translated into innovative action rather than some other strategy. Third, once the need for innovation as a strategic choice has been recognized, what capabilities are necessary for action? The results obtained on large organization innovations (Moch & Morse, 1977), which suggest a slack resources proposition, and theories on the importance of concentration of specialists (Hage, 1980) seem important here. Fourth, how do the strategic policy and structure of an organization as influenced by the organization's environment enter into an integrated theory of the innovation process? These are the four issues that are subsequently addressed in the course of developing propositions for testing and interpretation of the results of this study.

Organization Policy and Innovation

The organizing framework of this study is that of an environmentally contingent, policy theory of innovation. In order to simplify this approach, variables have been grouped into the three categories of context, policy, and innovation, and this general model is presented in Table 1. In this model, context-causes-policy-causes-innovation. There are two contextual factors, environmental uncertainty and organization size. Policy variables are limited to technology and market, consistent with the technological opportunity and market stimulus motivations for change. Performance gap is also included as an intervening variable along with technology and market policy. Finally, the dependent, innovation variables are rate of product and process innovation. Later, some of these variables will be decomposed to obtain

Table 1
Organization Policy Model of Innovation

Context	→	*Organization Policy*	→	*Innovation*
1. Environmental uncertainty		1. Technology policy		1. Rate of product innovation
2. Organization size		2. Market policy		2. Rate of process innovation
		3. Performance gap		

increased insight and understanding of this process. For example, environmental uncertainty will be decomposed by priority, market policy will be separated into top management and direct customer interface components, and innovation will be differentiated according to incremental versus radical departures from existing technology.

Organization Size

Mueller et al. (1979) have found that small (annual sales under $10 million) food equipment suppliers account for a surprisingly large percentage of innovations (44 percent) among food processor customers. The productivity of food processing companies was found to be very positively affected by these innovations, even though the food industry is very mature and capital-intensive (Abernathy, 1978). It is not surprising that several studies have found that mergers and joint ventures between small and large firms occur primarily for innovating purposes (Globerman, 1975; Hlavacek, Dovey, & Biondo, 1977; Owen, 1977). Studies of the automobile industry (Abernathy, 1978; Ettlie & Rubenstein, 1981; Rubenstein & Ettlie, 1979) have shown how the role of supplier and customer cooperation is important to the ultimate success of incorporation of innovations in the U.S. automobile industry.

Smaller firms are thought to be more innovative for a number of reasons. First, smaller firms often are starting out in a particular industry and establishing themselves initially through product innovation. They introduce new products—often those that incorporate radical departures from existing technology—in order to establish a foothold in areas in which larger, more established firms control markets (Goodman & Abernathy, 1978; Rothwell, 1978; Utterback & Abernathy, 1975) and in which large firms have an investment in existing, standardized technology (Morison, 1966). Smaller firms also may be more innovative because they can respond more easily to market shifts and needs. Occasionally a larger firm approximates this same degree of response flexibility by establishing special structural adaptations, such as ad hoc project groups, special R&D teams, or product or venture development groups. These groups can be separated from the normal day-to-day, short term planning and decision making in order to plan adjustments to environmental shifts. Finally, organizations may become more conservative as they grow into medium and large sized organizations because the risk of changing now-established technologies is greater than at the outset of the product life cycle. Smaller firms also may attract younger, more growth-oriented personnel, which probably also stimulates innovation, even though not all small firms are successful at achieving this change at the rate desired.

The plausible rival hypothesis is that large firms are more innovative because of access to slack resources, especially for radical change (Barreyre, 1978; Bourgeois, 1981). Several studies of the adoption of innovation have found a direct relationship between organization size and adoption of

innovation (Armour & Teece, 1980; Blau & McKinley, 1979; Carter & Williams, 1959; Moch, 1976; Moch & Morse, 1977; Pierce & Delbecq, 1977). Size, and therefore slack, probably is not a sufficient condition for innovation. There are enough exceptions to suspect that many large firms will not always be first with radical innovation, although they may have sufficient resources to solve major problems and seize major opportunities using innovation as a strategy. A compromise position might be that the relationship between size and innovation is curvilinear. Size promotes innovation up to a point (Kimberly & Evanisko, 1981). Based on these findings, the following proposition is offered for testing:

Proposition 1: Increasing organization size promotes innovation up to the point at which there are diminished returns to further growth.

Environmental Uncertainty and Technology Policy

A number of authors recently have attempted to get a handle on the strategic planning process and its impact on innovation decisions. It has always been assumed that there is some causal linkage between strategy and innovation, but it has been hard to document. In addition, several recent studies suggest that perceived environmental uncertainty might also be implicated in this causal chain (Hambrick, 1981; Hrebiniak & Snow, 1980). That is, uncertainty stimulates a change in strategy or policy, and that ultimately leads to innovation. Based on a review of the literature, Pierce and Delbecq hypothesize that "environmental uncertainty will be positively related with organizational innovation (initiation, adoption, and implementation)" (1977, p. 32). Duchesneau, Cohn, and Dutton (1979) found that environmental uncertainty was related to a shoe firm's competitive strategy to the extent that it became more future oriented and promoted consideration of innovation. Daft and Becker (1978) found that adoption of innovation was perceived to further goal attainment.

In the construction of the general model, technology policy becomes a central variable in an emerging modification of existing innovation theories. This policy is one type of long range environmental coping mechanisms (Bourgeois, 1980; Child, 1972; Dasqupta & Stiglitz, 1980). Environmental uncertainty, complexity, and larger organization size promote the development of the long range planning function in an organization (Lindsay & Rue, 1980). Technology policy may be the key intervening variable that has been missing in other studies that fail to show a continuing linkage between environment and structure (Pennings, 1975).

In a study of 54 organizations from both the goods-producing and service sectors, Ettlie and Bridges (1982) found that perceived environmental uncertainty promoted an aggressive technology policy (long range strategy for the adoption and production of process, product, and service innovations), and such a policy can be interpreted as a means of coping with an uncertain environment. This aggressive technology policy was found to increase the likelihood that a firm would have a specialized group to evaluate

new process innovations and this, in turn, led to the adoption of major but not minor process innovations. Technology policy was not found to have any significant effect on the production of new product innovations.

Several issues need resolution concerning technology policy and environment. First, can these earlier results be replicated for a homogeneous set of organizations? The issue of organization hypothesis testing with homogeneous vs. heterogeneous sets of organizations is raised by Gillespie and Mileti (1981), and both types of study designs are clearly needed. Second, the priorities placed on factors in the environmental domain and the various impacts of these factors have never been tested. Do the factors that cause the most uncertainty impact short range or long range planning the most? Decomposition of the environmental uncertainty variable into priorities could yield an answer. Also, what are the directions of these impacts? Third, the constitution of a reliable measure of organization technology policy begs validation. Fourth, are there any other causes of an aggressive technology policy besides environmental uncertainty? Fifth, and most important, does the technology policy variable subsume or cause the technological push phenomenon in parallel with the market pull factors that combine to cause innovation? Could some aspects of environmental uncertainty also promote product innovations perhaps by creating performance gaps?

The following two propositions are offered for testing:

Proposition 2: The greater the uncertainty that is perceived for the most important factor of the environment of a supplier firm, the more aggressive the technology policy that develops.

Proposition 3: The more aggressive the technology policy of a supplier firm, the more likely that organization will be innovative. The influence of technology policy on the rate of product or process innovation may be mediated by other variables like organization structure or concentration of specialists, but it ultimately will promote innovation.

Performance Gap

The existence of a performance gap, or performance below standards and expectations, has long been implicated in the literature as a stimulus of innovative activity. March and Simon hypothesize that "the rate of innovation is likely to increase when changes in the environment make the existing organizational procedures unsatisfactory. . . [and] predict efforts toward innovation in a company whose share of the market, total profits, or rate of return on investment had declined" (1958, p. 183). Hage (1980) has hypothesized, based on a review of the evidence, that a performance gap that stimulates innovation can result from changing the output standards of an organization as well as from declining performance on past standards. There also may be technological change in the environment of the firm or pressure from competitors causing a performance gap (Zaltman,

Duncan, & Holbek, 1973). Duchesneau et al. (1979) found that a performance gap, as perceived by the managerial staff, was a consistently good predictor of the adoption of process innovation by U.S. shoe manufacturers. Environmental change that is important to an organization will be translated into strategic threats and opportunities. That is, uncertainty is created as to how desirable performance will be obtained in the organization's future.

The following proposition is offered as a summary of these issues for testing:

Proposition 4: Environmental change and uncertainty cause performance gaps in organizations and discredit current policy. An organization's recognition of a performance gap, either by posing decreased performance or by changing standards, will result in the modification of organization policies in order to increase innovation activity, provided that the performance gap is not so severe as to make slack resources unavailable.

Market Policy

Marketing and selling policy are central to the planning of most organizations, and a variety of approaches appear to be possible. In particular, the personal contact of representatives from top managers of supplier firms with potential customers appears to be important in selling new process innovation. This is consistent with the finding that successful suppliers of radical innovations emphasize service in promoting adoption among their customers (Rothwell, 1977). That is, the involvement of top management in most phases of the innovation process would appear to be important for a variety of reasons.

First, the involvement of supplier top management with innovation customers is an attempt to demonstrate the high priority and importance of a new product or service and also the commitment of the supplier to post-adoption support. This is an attempt to reduce the perceived risk to customers for adoption and to insure success of a new venture. A typical concern in the acceptance of a new piece of equipment, for example, is the fear among potential users that the supplier firm might ultimately drop the product and will be unable to support implementation and continuing service. Resistance to change in a mature food industry may be especially great because of the commitment to established, standardized technologies.

Second, management is important for coordinating marketing and technical functions of the firm as well as setting the tone, climate, and direction of innovative efforts. Several studies have found that the innovation process is more effective when market need and technological opportunities are integrated at the organizational level of analysis (Mansfield & Wagner, 1975) and that top management involvement can be instrumental in achieving this integration. In summary, the involvement of top management in marketing innovative products can reduce the risk barriers of adoption,

integrate marketing and technical efforts, and increase the probability of success of a new venture by insuring concentration of the most skilled personnel in the innovative effort.

Whether this process is moderated by size of the organization, a situation in which smaller firms might involve top managers more, has yet to be tested. A summary proposition is offered:

Proposition 5: The successful development and marketing of innovation by supplier firms require the direct involvement of supplier top management to reduce perceived risk by customers and to interface technical marketing functions.

Method

A stratified, random sample of equipment and package suppliers of the food processing industry was selected for a mailed questionnaire survey. A total of 58 firms returned questionnaires for a response rate of 46 percent (58 returns/126 eligible firms). These firms were divided into four categories and stratified by size: manufacturers of metal cans (small had 20-100 employees, large had 101+ employees), manufacturers of food processing equipment (small and large), and manufacturers of food packaging and food packaging equipment (small and large), and a certainty sample of firms known to be seriously considering or actually marketing radical innovation in primary packaging for the food industry, retortable pouches and trays, or the equipment to form, fill, and seal these flexible containers. This innovation is part of a general trend toward flexible packaging for food.

Respondents indicated their job titles on the return questionnaire, and the resulting distribution was as follows: chief executive officer, 3; president, 25; vice president, 12; general manager, 5; controller, 2; plant manager, 4; and manager, 7. Assuming that the first three levels are always members of top management, about 69 percent (40/58) of this organizational sample was represented by this group. Only 8 of these 58 cases returned an unsigned questionnaire. It was assumed that these questionnaires were completed by the addressee. The remainder of retained cases had as a minimum requirement that a manager responded. In most of these cases the respondent was designated by the chief executive officer or president as a worthy representative of top management. This latter information was obtained, in part, from a telephone follow-up to supplier firms that did not respond to the first wave of the questionnaire (Ettlie, 1981).

Data for analysis were obtained from questions pertaining to the following variables, which are summarized in Table 2.

Measures

Contextual Variables. There are two contextual variables in this study: organization size and perceived environmental uncertainty. Organization size was measured by the natural log of the number of year-round employees



Table 2
Summary of Scales

Scale	*Cronbach Alpha*	*Items*	*Corrected Item-Total Correlation*
Technology policy	.78	We have a long tradition and reputation in our industry of attempting to be first to try out new methods and equipment.	.37
		We spend less than most firms in our industry on new products development.[a]	.49
		We are actively engaged in a campaign to recruit the best qualified technical personnel available in engineering and production.	.66
		We are actively engaged in a campaign to recruit the best qualified marketing personnel available.	.60
		We are strongly committed to technological forecasting.	.73
Performance gap	.62	Given current economic conditions, is your food processing supply company's performance much better, as expected, worse than expected, or much worse than expected a year ago.	.45
		Compared to five years ago, was the after-tax rate of return for your food process supply company for the last fiscal year much higher, higher, about the same, lower, or much lower?	.45
Direct market policy	.56	Does your food processing supply company employ sales personnel who deal directly with customers?	.37
		Do top managers ever become involved with customers in the sale of equipment or supplies?	.34
		Do top managers ever become involved with customers for purposes other than a sale (e.g., customer relations, follow-up after sales, etc.)?	.48
Production of retortable packaging, supplies, or equipment	.86	Does your firm manufacture retortable pouches or trays?	.67
		Does your firm manufacture forming, filling, and sealing machinery for retortable pouches or trays?	.79
		Does your firm plan to introduce any retortable packaging equipment or containers?	.88
		Has your firm developed a long-range strategy for marketing retortable packaging equipment or containers to food processors?	.78
Perceived environmental uncertainty			
Factor 1 (capital supply, 26%; competition, 16%; new products, 10%)	.87	How often do you believe that the information about each of the three factors you selected... is adequate for decision making?	.64
		How difficult is it for your firm to get the minimum necessary information about each of the three factors you selected... for decision making?	.87
		How difficult is it for your firm to obtain additional information about each of the three factors you selected... when you need the information for decision-making?	.75
Factor 2 (customers, 18%; competitors, 16%; new processes, 14%)	.82	"	.46
		"	.81
		"	.77
Factor 3 (customers, 17%; competitors, 17%; new products, 15%; new processes, 15%)	.77	"	.41
		"	.69
		"	.73

[a]Reverse scoring.

(Kimberly & Evanisko, 1981). Perceived environmental uncertainty was measured with a modified version of the Downey, Hellriegel, and Slocum (1975) adaptation of the Duncan (1972) instrument, which asks for only 3 external environmental factors from a list of 14. This type of scale also was used successfully by Ettlie and Bridges (1982).

Instructions to respondents read as follows:

> Lack of information about a firm's environment can lead to uncertainty in decision making. Below is a list of some of the factors in a firm's environment that can cause uncertainty in decision making in your food processing supply company. Please rank the three most important factors by writing in the number corresponding to the factor in the appropriate space.

The most frequently mentioned important factors contributing to information uncertainty in the environment of these supplier firms were as follows: Factor 1, capital supply (26 percent), competition (16 percent), and new product requirements of the industry (10 percent); Factor 2, customers (18 percent), competitors (16 percent), and new process innovations (14 percent); Factor 3, customers (17 percent), competitors (17 percent), new products (15 percent), and new processes (15 percent). The three factors were scaled separately for each of the three information uncertainty questions (Table 1). The resulting Cronbach alpha for Factor 1 was .87; for Factor 2, .82; and for Factor 3, a Cronbach alpha of .77. The total summed scale coefficient alpha was .86. These category priorities are similar to those reviewed by Hambrick (1981) and results reported by Hrebiniak and Snow (1980). Decomposition of this scale by environmental priority is a key feature of its application in this study.

Organizational Policy Variables. Technology policy was measured by an 8-item, 5-choice Likert scale adapted from Ettlie and Bridges (1982). Five of these items survived the factor and item analysis, with a Cronbach alpha of .78. They included questions on a tradition of being first with new methods and equipment, recruiting technical and marketing personnel, money spent on new product development, and commitment to technological forecasting.

Because performance gap was hypothesized to be a function of contextual variables, it was included here with the intervening policy variables of the study.

Three items were used to measure performance gap, two of which make a scale with Cronbach alpha of .62. They both are questions involving comparison of performance with expectations and previous levels in the short term (one year) and long term (five years). The question that did not make the scale was the percent of plant production capacity utilization.

The challenge of measuring the involvement of top management in the marketing aspects of innovation was one issue here. Therefore, the market policy variable was ultimately decomposed into two scales. The first scale was called direct market policy. The three questions used to probe this variable make a scale that just meets minimal reliability requirements with a Cronbach alpha of .56. The first question asks if sales personnel are

employed that are involved in direct customer contact. The second two questions involve top management: do top managers get involved in selling and/or other customer-related activities? This variable is distinct from the concept of market strategy, which usually is considered to be the choice of market and product mix. Direct marketing to customers with top management involvement was hypothesized as an important feature of the innovation process for suppliers.

The second variable was constructed from the responses to an open-ended question concerning the circumstances under which top managers become involved in customer sales. The top management–customer interface scale was expected to expand substantially on the market policy variable here. Firms were coded according to the extent to which a special priority system was used by top managers for becoming involved with customers. In other words, high scores were assigned for specific priority systems, lower scores were assigned for vague priority systems, and lowest scores for no priority system. Scores were assigned as follows: a score of 5 was assigned to the response category, "most important projects, customers, new projects, problems"; a score of 4 was assigned to the category, "special occasions (trade shows, seminars, etc.)"; a score of 3 was assigned to "final contract negotiations, closing, or at customer request"; a score of 2 was assigned to the category, "as needed"; and a score of 1 was assigned to "primary job of management" or "rarely." This variable was called top management customer relations and is a variant on the management by exception principle.

Dependent Variables. Four measures of innovation are used in this study. Two relate to product innovation: (1) the rate of product innovation, the number of new products introduced during the last three years; and (2) the introduction of one particular radical product, retortable packaging or equipment to form, fill, seal, and process retortable packaging. This technology is a flexible or semirigid package that is thermostabilized like a metal can and is shelf-stable. A total of 53 percent of responding suppliers rated this innovation as the most radical departure from existing technology on a list of 13 packaging technologies. No other technology was rated as more radical. To measure whether or not a supplier was currently offering or considering manufacture of this technology, a scale of four items was developed, with a Cronbach alpha of .86. The questions ask if the firm is manufacturing the retortable pouch or tray, or equipment to form, fill, and seal the pack, and if the firm plans to introduce or has a long range strategy for marketing the components of this innovation.

For the seven follow-up supplier firm interview cases that have been concluded at this writing, the Pearson product-moment correlation coefficient for the items on this scale after a period of about six months is $r = .87$ ($p < .01$) for 28 respondents. These results indicate a high degree of external validity and stability for this scale. Except for one case, there was also perfect agreement between multiple respondents for each of these seven firms.

The second category of dependent variables is the rate of process innovation, and this was decomposed into two types: (1) the number of major or radical process innovations (incorporating technology new to the industry) and (2) the number of minor or incremental process innovations. Both covered the past three years and were indicated with examples by respondents.

Results

Correlation Matrix and Descriptive Statistics

The means, standard deviations, and zero-order Pearson r correlation coefficients for the variables introduced earlier are summarized in Table 3. A total of 54 complete data cases are included in this analysis.

The largest zero-order coefficients in the correlation matrix are for the relationships between the rate of radical and incremental process adoption ($r = .61, p < .01$), the rate of adoption of radical processes with technology policy ($r = .54, p < .01$), and for the second two priority factors of environmental uncertainty ($r = .56, p < .01$).

Causal Model

In Figure 1 a path analytic diagram is presented to summarize the relationships among key variables in the study for food supplier firms ($n = 54$). For purposes of this analysis, and consistent with the general model and five propositions being tested, the following four variables were considered exogenous to the system: the three factors of perceived environmental uncertainty and the natural log of the number of year-round employees. Technology policy, direct marketing policy, top management customer relations, and performance gap were considered to be a function of the four exogenous variables of context.

Relationships among endogenous variables were treated recursively with production of retortable packaging technology, the rate of new product introduction, and the rate of incremental and radical process innovation adoption taken as dependent. The three organization policy variables were also allowed to be a function of performance gap, although this configuration was not supported by these data. Direct marketing policy also was taken as dependent on top management customer involvement priority.

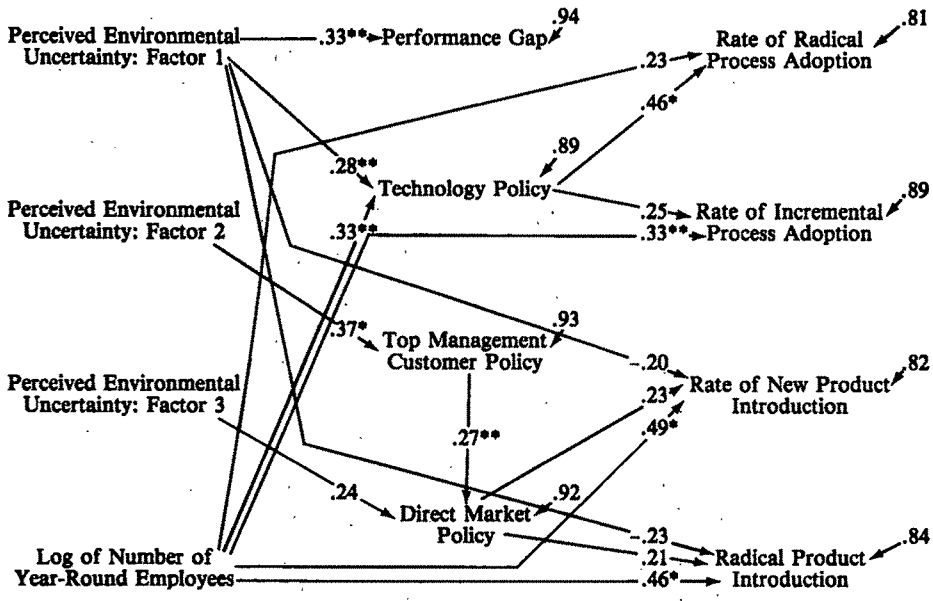
The path coefficients reported in Figure 1 are standardized regression coefficients estimated by ordinary least-squares. The model is overspecified, with only those variables retained in each equation up to the point at which the adjusted R^2 begins to decline. This selection criterion results in the inclusion of some path coefficients that are nonsignificant, even though they contribute to a significant regression equation. A goodness-of-fit test for the adequacy of the overall restricted model was performed (Land, 1973) with a resulting $\chi^2 = 12.69$ (34 degrees of freedom; $p > .5$), which is

Table 3
Correlation Matrix and Descriptive Statistics
($N = 54$)

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1. Direct market policy	1.0											
2. Top management customer policy	.30**	1.0										
3. Technology policy	.13	−.15	1.0									
4. Log of employees	.10	−.07	.36*	1.0								
5. Perceived environmental uncertainty: 1	.06	.14	.32**	.13	1.0							
6. Perceived environmental uncertainty: 2	.13	.37*	.03	.19	.44*	1.0						
7. Perceived environmental uncertainty: 3	.27**	.13	.02	.04	.37*	.56*	1.0					
8. Performance gap	.06	−.01	.01	.22	.33**	.26	.18	1.0				
9. Rate of new product introduction	.27**	.12	.24	.48*	−.12	.09	−.06	.08	1.0			
10. Rate of radical process adoption	−.01	−.10	.54*	.39*	.20	.10	−.04	.02	.19	1.0		
11. Rate of incremental process adoption	.06	−.10	.36*	.39*	.26	.08	−.12	.10	.24	.61*	1.0	
12. Radical product introduction	.24	.04	.16	.45*	−.16	.11	.02	.00	.45*	.09	.21	1.0
Mean	5.72	3.04	16.98	5.31	9.11	8.59	9.22	5.65	4.31	.98	2.15	5.06
Standard Deviation	.68	1.61	3.92	2.22	2.99	2.54	2.48	1.86	5.68	1.43	2.10	1.71

*$p < .01$ ($r = .3482$, $p = .01$, two-tailed test)
**$p < .05$ ($r = .2684$, $p = .05$, two-tailed test)

Figure 1
Causal Model
($N = 54$)



*$p < .01$
**$p < .05$

not significant. It was concluded that no significant information was lost by the exclusion of some coefficients. Correlation coefficients for relationships between exogenous variables are included in Table 3.

Overall, the general model of context causes organization policy causes innovation is supported by these data. Although the explained variance in these regressions is not large (R^2 varies from about .11 to .34), the general pattern that emerges is as predicted and relatively unambiguous. Increasing organization size up to a point and perceived environmental uncertainty cause organizational policy that ultimately stimulates product and process innovation.

Proposition Tests

Proposition 1 is strongly supported by the causal model results. Organization size, as measured by the natural log of the number of year-round supplier employees, was significantly and directly related to the rate of new product introduction (path coefficient, $pc = .49$, $p < .01$); the introduction of retortable packaging technology, a radical product innovation ($pc = .46$, $p < .01$); the rate of adoption of incremental processes ($pc = .30$, $p < .05$); and an aggressive technology ($pc = .33$, $p < .05$). As a contextual variable,

increasing organization size up to a point is an important direct cause of product innovation and is mediated by long range technology policy to influence radical process adoption.

Proposition 2 is strongly supported by the causal model results. That is, the most important factor of perceived environmental uncertainty for a supplier firm significantly promotes an aggressive technology policy ($pc = .28$, $p < .05$); whereas the second priority factor for environmental uncertainty supports a top management customer relations priority system ($pc = .37$, $p < .01$). Further, the third factor of perceived environmental uncertainty tends to encourage direct market selling ($pc = .24$, n.s.). In general, it seems that the more important the factor that is attended to by the firm in its environment, and the more uncertainty that is perceived in that factor, the more likely long range technology policy is affected—usually it becomes more aggressive, assuming resources are available. Secondary environmental uncertainty causes market policy changes.

It also is noteworthy that the direct effects of environmental uncertainty factor 1 discourage innovation, although the impacts are less pronounced. The first factor of environmental uncertainty priority discourages new product introduction ($pc = -.20$, n.s.) and introduction of one particular radical packaging innovation, retortable packaging or equipment ($pc = -.23$, n.s.). These path coefficients are not significant, but this top priority uncertainty in the firm's environment does contribute to significant regressions for those two innovation outcomes.

Proposition 3 is strongly supported by the results. This is, an aggressive technology policy is likely to promote adoption of radical process innovations ($pc = .46$, $p < .01$). An aggressive technology policy moderately supports the adoption of incremental process innovation as well ($pc = .25$, n.s.).

Proposition 4 is stated in two parts. First, it is hypothesized that context, here perceived environmental uncertainty, causes performance gaps in organizations. This part of the proposition is supported. The greater the uncertainty that is perceived in the supplier firm's environment (Factor 1), the greater the performance gap ($pc = .33$, $p < .05$).

The second part of the proposition is not supported. Performance gap directly causes neither significant policy changes nor innovation.

Finally, Proposition 5 concerns the direct involvement of top management in the marketing aspects of the firm and the subsequent impact of this involvement on innovation. This proposition is moderately supported by the results. As mentioned earlier, the second and third most important factors contributing to perceived environmental uncertainty encourage a top management priority system for customer relations and direct marketing policy with top management involvement, respectively. In addition, direct marketing policy is predicted by top management using an exception system to become involved with customers on only those occasions that concern important, usually innovative products ($pc = .27$, $p < .05$).

Direct marketing policy, which involved supplier firm sales personnel and top management interface with customers, is included in significant

regressions to predict the new product introduction rate ($pc = .23$, n.s.) and the introduction of a radical product, retortable packaging technology ($pc = .21$, n.s.). It is noteworthy that in this configuration of the model, the introduction of a radical product follows a causal pattern similar to that of the rate of new product introduction. Because the technology policy scale includes an item that identifies firms spending more than competitors on new product introduction, the relationship may be more complex than suggested by these somewhat simplified results. Product introduction rate and radical product are correlated ($r = .45$, $p < .01$).

Discussion

The results of this study support an emerging, environmentally contingent policy theory of the organizational innovation process. The proposed model of context-causes-policy-causes-innovation generally is supported by the results. The theory-data fit is not perfect and much continues to be only partially understood, but this appears to be a promising beginning. Four lingering issues of innovation research were introduced earlier.

Innovation Stimulus

Based on the model and results of this study, the primary stimulus for innovation in organizations appears to be policy as strongly influenced by context. The contextual factors are (1) increasing organization size up to a point and (2) perceived environmental uncertainty. For this sample of supplier firms to the mature food processing sector, uncertainties in capital supply, competition, new product needs, customers, and new process needs are most keenly felt. Although environmental change and uncertainty impact policy and cause performance gaps, it is the policy variables that predict innovation outcomes, that is, rate of new product and process introduction. Little or no support was found in the results of this study for a performance gap theory of innovation. Perhaps one of the reasons for this is the strong dependence of this policy model on organization-size context, which suggests that when performance gaps become extreme, slack resources for innovation are adversely affected.

Market Opportunity Versus Technological Capability

The apparent contradiction in the innovation literature that suggests that innovation is caused exclusively by market or technology factors is partially resolved by the results of this study. Technology factors of policy tend to be impacted by high priority environmental factors—in this sample, usually capital supply, competition, or new product needs. Process change results. Lower priority environmental uncertainties tend to impact market policy factors and then new product introduction. But new product introduction is more dependent on organizational size up to a point,

which suggests that growth and slack resources mitigate short range market policy impacts. The results of this study are by no means the final answer to this question. Perceptual measures of policy and environment as well as cross-sectional survey data limit the ability to obtain unqualified conclusions on this issue.

Policy Implementation

A consistent finding of this study is that organization size, as measured by the number of year-round employees, stimulates innovation up to a point. Clearly, policy implementation depends on factors other than available resources, such as organization structure, concentration of specialists, and timing. But these other factors are not adequately accounted for in this study. What is apparent is that increasing size makes these firms more innovative by encouraging a more aggressive long range policy and by enabling shorter range market policies to be enacted. At some point the benefits of increasing size are no longer forthcoming. The other slack resources necessary for innovation, such as facilities, time for experimentation, and human resources, were not included here.

Strategy and Environment

The general model of the innovation process supported by the results of this study suggests that organizational policy is very much dependent on the context of an organization, and that policy has an important effect on the innovation outcomes of the organization. Specifically, the most important factors in the environment of a firm impact long range technology policy, whereas secondary environmental factors impact market policies. Increasing organization size impacts long range technology policy and innovation outcomes, such as rate of new product introduction, only up to a point. Size stimulates innovation until the organization becomes so large that further growth does not stimulate change. What is not clear from this model or these results is how organization structure operates in this process. The results of other studies suggest that the relationship between organization size and structure is also curvilinear when the natural log of number of employees is used as the size indicator (Kimberly & Evanisko, 1981). But size, structure, and policy need to be combined in the study of the innovation process.

Another reality that is not accounted for in this study is the other aspects of environment of an organization that are not enacted or perceived. At a minimum it would be interesting to see how objective versus perceived measures of environmental uncertainty influence the innovation process (Downey et al., 1975).

Finally, the role of suppliers in the adoption decisions made by food processors also deserves further investigation. How do suppliers pick out a select target group of potential customers for the initial marketing of new

equipment and packaging technology? How do suppliers subsidize the innovation process of their users with time, people, and financial resources (slack) to promote adoption of innovations? The process by which suppliers decide which old or new customers to approach, what type of joint development arrangements are feasible, and what fall-back policy positions are used when encountering failure are all issues that are promising candidates for the research agenda.

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Measures of Perrow's Work Unit Technology: An Empirical Assessment and a New Scale

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Six instruments previously used to assess Perrow's dimensions of work unit technology are evaluated. The findings suggest convergent validity across measures of the analyzability and exceptions dimensions. A new instrument is developed that has somewhat greater ability to differentiate among work units and that improves the fit between the theoretical constructs and their empirical measures.

Organizational technology has been increasingly used as one explanation for organization structure and process. Several conceptual schemes initially appeared in the literature (Hickson, Pugh, & Pheysey, 1969; Perrow, 1967, Thompson, 1967; Woodward, 1965). Quite a large number of empirical investigations using these conceptual schemes have since been reported, several of which indicated that technology may be related to organizational characteristics (Blau, Falbe, McKinley, & Tracy, 1976; Glisson, 1978; Grimes & Klein, 1973; Hage & Aiken, 1969; Harvey, 1968; Hickson et al., 1969; Hrebiniak, 1974; Mohr, 1971; Van de Ven & Delbecq, 1974).

The emergence of the empirical literature has been associated with problems of definition and measurement. Reviews of the technology literature have pointed out that different measurement scales often have common names, variables with different names often overlap conceptually, and instruments are seldom validated (Ford & Slocum, 1977; Fry, 1982; Rousseau, 1979; Stanfield, 1976). Measurement of central constructs has been a persistent problem in organization theory, as seen in previous failures to obtain convergent validity (Downey, Hellreigel, & Slocum, 1975; Pennings,

1973; Tosi, Aldag & Storey, 1973). The result of measurement inconsistency is uncertainty for scholars about the extent to which comparable data have been collected in earlier research and the degree to which findings are cumulative across studies. Moreover, scholars have no way to determine which measurement scales are most appropriate for future research. Standardization and validation of measurement devices may assist researchers in their efforts to add to the body of knowledge in a systematic, cumulative fashion.

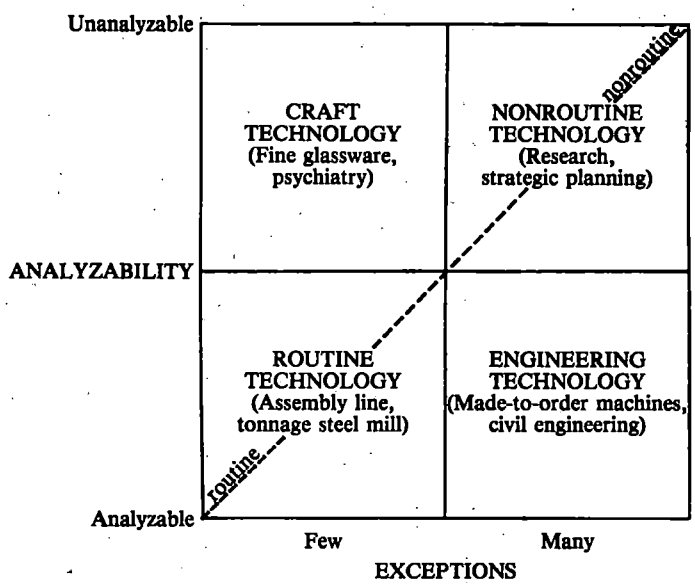
The purpose of this paper is to provide a systematic comparison among measures of a work unit technology and to improve on the current measures. The study is designed to provide tentative answers to three basic questions: First, to what extent do instruments from separate studies of work unit technology measure the same constructs? Second, do any of the scales show superior convergent and discriminant validity? Third, can an improved instrument be developed from the existing scales? These questions seem important to address because theory development rests, in part, on the adequacy with which technology constructs are operationalized.

Perrow's Model of Technology

Recent discussions of technology studies have revealed the diversity of research approaches (Fry, 1982; Slocum & Sims, 1980). Operational definitions of technology have focused on such things as work flow, raw materials, or perceived worker tasks. Various levels of analysis also have been used. This diversity represents both a strength and weakness and probably is necessary in the early stages of research. The technology literature is sufficiently broad that no single conceptual scheme can embrace the diverse concepts and measures, but a number of studies appear to be related to the ideas described by Perrow (1967). Several studies operationalized one or more of the dimensions he proposed, and several other studies have the potential to fit within the categories he described.

Perrow (1967, 1970) described organizational technology as the actions employed to transform inputs into outputs. Perrow identified two dimensions along which these transformation processes could be described. The first dimension is number of exceptions. This refers to task variety, which is the frequency of unexpected and novel events that occur in the conversion process. When the number of exceptions is high, participants typically cannot predict problems in advance and many tasks are unique. When few exceptions occur, tasks have little novelty and are repetitious. The second dimension is analyzability. When the conversion process is analyzable, the work often can be reduced to mechanical steps, and participants can follow an objective, computational procedure to solve problems. When work is unanalyzable, there is no objective calculation or procedure to tell a person how to respond. Participants have to spend time thinking about how to solve problems, and they may actively search beyond readily available procedures. Judgments based on intuition and experience figure prominently in unanalyzable work decisions.

Figure 1
Perrow's Technology Dimensions



The two dimensions of technology form the basis for four categories of technology, as illustrated in Figure 1. Perrow also proposed the existence of the routine-nonroutine diagonal which contains elements of both exceptions and analyzability. Finally, Perrow suggested that although conceptually distinct, the two dimensions may be statistically correlated in organizations because, when problems are frequent and unexpected, they also are less analyzable. A positive correlation between the two dimensions has been found in empirical studies (Daft & Macintosh, 1981; Van de Ven & Delbecq, 1974).

Perrow's framework appears to represent an appropriate starting point for seeking conceptual and empirical measurement convergence in the technology literature. The rationale for this focus contains several parts. First, the two dimensions represent basic characteristics of interest to organizational scholars. The notion of exceptions, for example, is similar to activities that have been described in terms of variability (Pugh, Hickson, Hinnings, & Turner, 1969; Van de Ven & Delbecq, 1974); uniformity (Mohr, 1971); predictability (Galbraith, 1973; March & Simon, 1958); and complexity (Duncan, 1972). An organization setting that has a large number of exceptions would tend to be characterized as less stable, less predictable, and more complex. Similarly, the notion of analyzability is conceptually linked to other constructs. Analyzability is similar to what Thompson (1967) called knowledge of cause-effect relationships, the search procedures described by Cyert and March (1963), and task characteristics favoring programmed or unprogrammed organizational responses (March & Simon, 1958). The exceptions and analyzability constructs also parallel classifications

that exist in the social cognition and judgment literature (Einhorn & Hogarth, 1981).

The second part of the rationale is that Perrow's framework has the potential to embrace a range of technology research, so measurement clarity may have broad application. Several empirical studies grew directly out of Perrow's framework (Daft & Macintosh, 1981; Glisson, 1978; Hage & Aiken, 1969; Lynch, 1974; Mohr, 1971; Van de Ven & Delbecq, 1974), and several additional studies use concepts that may overlap the analyzability and exceptions categories. Large batch manufacturing (Woodward, 1965), for example, tends to be well understood and to have a small number of exceptions. Hence it would fit the routine category. High operating variability (Child, 1972; Pugh et al., 1969) appears similar to the nonroutine category described by Perrow.

The final reason for using Perrow's framework is that it has been frequently used at the work unit level of analysis. Statistical findings between technology and other variables have been strongest at the work unit level (Fry, 1982). Technology appears to have greater impact at the unit level or in small organizations (Hickson et al., 1969; Reimann, 1980). One explanation is that homogeneity is greater; diverse activities are less likely to confound the relationship between technology and structure. Moreover, participants are not several levels removed in the hierarchy, so the impact of technology in smaller units may be felt more directly. Thus, the exploratory comparison of measurement scales here will use work units as the level of analysis.

Six Technology Studies

Samples of technology measures from six studies were examined. The measures were selected to include the four studies that operationalized both the exceptions and analyzability dimensions of Perrow's theory. Single scales from two additional studies also were included because they were explicitly based on Perrow's theory. The selection of measures was not comprehensive, but it did include major studies that developed scales and reported findings based on Perrow's technology concepts. Researchers in each study used their own questionnaire scales to survey individual workers, and responses were averaged to represent a unit score.

1. Hage and Aiken (1969) investigated the relationships among technology, structure, and goals in a sample of community welfare agencies. They assessed only one dimension of Perrow's model, which was intended to be the routine-nonroutine diagonal. A subsequent analysis of this scale (Dewar, Whetten & Boje, 1980) indicated that it is reliable and valid but that the items pertain to the exceptions dimension of Perrow's theory.

2. Lynch (1974) developed a measurement scale based on Perrow's theory using a sample of departments from three large academic libraries. Factor analysis of questionnaire items yielded three primary dimensions that Lynch argued had reasonable face validity. Two of the dimensions were labeled

routineness and predictability, which correspond roughly to Perrow's exceptions and analyzability dimensions. Lynch argued that the third dimension—insufficient knowledge—was implicit in the Perrow model because a certain amount of knowledge is required before any task can be completed. Although both dimensions of Perrow's model are arguably present, Lynch concluded that the three dimensions could be aggregated into a single dimension that appeared to represent the routine-nonroutine diagonal.

3. Glisson (1978) used a 6-item instrument (including four of Lynch's items) to examine the relationship between task routinization and four structural variables. This study also utilized the routine-nonroutine dimension of technology. No external validation of the instrument was reported.

4. Van de Ven and Delbecq (1974) classified 120 employment and security agency work units on the basis of structure. The classification scheme was based on two dimensions of technology that closely paralleled Perrow's model. Van de Ven and Delbecq used the terms variability and difficulty to correspond to Perrow's exceptions and analyzability, and the work units seemed to be classifiable along those two dimensions. No validation of the measurement instrument was reported.

5. Daft and Macintosh (1981) attempted to link Perrow's technology concepts with information processing variables. Exceptions and analyzability measures were developed using factor analysis to identify items that represented the two dimensions described by Perrow. The questionnaire items had face validity, but no external validation was reported.

6. The final study was reported by Van de Ven and Ferry (1980). They developed items to assess task variability and difficulty as part of a large organizational assessment questionnaire. They reported that the two technology dimensions were related to various structure and process variables. The dimensions were developed through factor analysis, and each dimension correlated positively with external judges' ratings of the work done in the units.

Eleven technology subscales were used in the above studies, all of which are included in the present research. Questions for each subscale may be obtained from the authors.

Method

The research strategy was composed of four elements: (1) A questionnaire containing all subscales was administered to members and supervisors of work units that were expected to vary on both technology dimensions of Perrow's framework. From these data was constructed a multitrait-multimethod correlation matrix to test the convergent and discriminant validity of the technology scales and also to factor analyze the responses to learn whether the scales measured common dimensions. (2) A modest assessment of external validity was made by comparing the responses of work unit members to responses of supervisors and to ratings of the work

units by outside judges. (3) The ability of the scales to discriminate among unit technologies was assessed using analysis of variance and covariance. (4) New scales for the two dimensions were developed by selecting items that clearly reflected Perrow's concepts and that empirically differentiated the work units.

Sample

A sample of 23 work units was drawn from a large Canadian government agency. This agency was asked to participate because of the unusual diversity of work unit activities performed within it. Exhibit 1 lists the work units, which include routine clerical units, research, and highly technical

Exhibit 1
Work Units Included in the Study

Librarians	Computer systems analysis
Purchasing	Commodity officers
Records management	Census training program
Personnel (clerks)	Creative design
Typing	Construction price estimation
Editing (clerks)	Personnel—training package group
Computer operation	Personnel—unit heads
Audit	Methodology
Forms management	Econometrics
Graphic design	Standards establishment
Cultural data interpretation	Input/output table generation
Computer programming	

unit activities. The work units were selected using three criteria. First, because the analysis was conducted at the work unit level, only units with homogeneous activities were used. Homogeneity was operationalized by working with agency managers and job descriptions to identify units in which employees performed common tasks. The second criterion was that units represent variation along the analyzability and exceptions dimensions of technology. Based on a description of Perrow's four cells, units were identified that had high a priori probability of representing diverse technologies. The third criterion was that each subordinate in the work unit report to a common supervisor. This was necessary to permit analysis of superior versus subordinate responses on the technology measures.

A total of 204 individuals completed the questionnaire, which included usable responses from 23 supervisors and 169 workers. Worker responses were averaged to form work unit scores for each measure of technology. Supervisor responses were held out to compare with employee responses in the validation part of the study. The sample is not large. Thus, generalization of the findings is restricted. The sample is diverse, however, and does provide a basis for a test of the extent to which the scales converge and discriminate among work units.

Questionnaire

The questionnaire contained 50 technology items. Of these, 45 were from the six previous studies; the additional 5 items were the Job Characteristics Inventory (JCI) measure of task variety (Sims, Szilagyi, & Keller, 1976). These 50 items contained substantial repetition, so they were interspersed with questions about other organizational conditions, such as interdependence between and within groups, locus of control, and influence. Respondents were asked to circle a number between 1 and 7 that indicated their degree of agreement with each item as a description of the work done in their unit. Approximately half of the items were reverse scored. In addition, open-ended questions asked for a written description of the activities that made up a typical work day and the percentage of time spent on each major activity. Employees and the supervisor from each work unit were brought together to complete the questionnaire in the presence of the first author. Supervisors were given explicit instructions to answer the questions based on subordinates' work activities and *not* based on their own administrative tasks. The questionnaire took approximately 40 minutes to complete.

Three tests of variance homogeneity were performed on each of the subscales as a check on the appropriateness of using work units as the level of analysis. The Cochran-F test revealed violation of the homogeneity of work unit assumption for only the Glisson (single dimension) scale ($p = .002$) and the Hage and Aiken (single dimension) scale ($p = .003$), but the Bartlett-Box test also showed that the Hage and Aiken scale violated the homogeneity assumption ($p = .039$). When each work unit's variance was compared to sample variance (Tushman, 1977), two subscales showed no work unit violating the homogeneity assumption, six of the subscales showed only one work unit violating it, and four of the subscales showed two work units violating the assumption. Because the work units that violated the variance homogeneity assumption differed across subscales, these results were not regarded as sufficiently strong to discard specific work units. Tests of the homogeneity assumption suggest that work unit heterogeneity was not a serious problem in this sample, supporting the case for using the work unit as the unit of analysis. The Hage and Aiken scale, however, was more prone to within-unit variance, suggesting that the scale may be more appropriate as an individual level measure.

External Raters

Two external raters participated. These judges were professors who had experience with Perrow's framework in both teaching and research. Judges' ratings were based on written descriptions that respondents' provided in response to the open-ended question and from name of the unit and job titles. Questionnaire responses were not available to the judges. Each judge worked independently and supplied a rating between 1 and 7 on both

technology dimensions for each of the 23 units. The judges' pooled responses were used in subsequent analysis.

Results

Factor Analysis

For each of the 169 employees in the sample, scores for the 11 subscales and the JCI scale were formed by calculating the average response to the appropriate items. A factor analysis was then conducted on the 12 subscales. The factor analysis was performed for the 169 respondents to determine whether they discriminated between the two dimensions of technology as independent concepts. (Discrimination across work units was tested with analysis of variance.) The Table 1 findings show that only two factors emerged, and they were what would be predicted by Perrow's model of technology. All of the exceptions subscales load more heavily on one factor and all of the analyzability subscales load more heavily on the other, although the Van de Ven and Ferry "variability" scale loads fairly heavily on the analyzability factor. The 2-factor result is consistent with the view that individual respondents perceived the two dimensions described by Perrow in their work unit activities. The loadings of the subscales indicate that separate investigations that operationalized Perrow's two dimensions probably were measuring similar phenomena.

Table 1
Factor Structures of Twelve Subscales, Oblique Rotation ($N = 169$)

Subscales	*Factor 1*	*Factor 2*
Hage & Aiken (1969)	.93	-.12
JCI—variety	.92	-.10
Daft & Macintosh (1981)—variety	.80	.08
Van de Ven & Delbecq (1974)—variability	.72	.26
Lynch (1974)—routineness	.70	.05
Van de Ven & Ferry (1980)—variability	.50	.43
Van de Ven & Delbecq (1974)—difficulty	-.10	.92
Van de Ven & Ferry (1980)—difficulty	-.02	.83
Daft & Macintosh (1981)—analyzability	.12	.60
Lynch (1974)—predictability	-.04	.53
Glisson (1978)	.50	.48
Lynch (1974)—insufficient knowledge	.10	.30

Three of the scales were single dimension scales and therefore are not appropriate for subsequent convergent and discriminant validity tests. Only the factor analysis results for these three scales could be used to determine what dimensions the scales were tapping. The Hage and Aiken scale loaded very heavily on the exceptions dimension. This is similar to results from other

research into the Hage and Aiken instrument (Dewar et al., 1980) and probably means that Hage and Aiken were capturing exceptions or task variety as the dominant characteristic of work activity in their welfare agencies. The Glisson study also used only one scale, and it loaded about equally on the two factors. This, coupled with an inspection of the Glisson items, suggests that the scale is a mixture of the two dimensions and may be measuring the routineness diagonal. Two of Lynch's scales loaded on the two factors, and they correspond to Perrow's dimensions, as Lynch suggested. The third subscale used by Lynch (insufficient knowledge) loaded on neither of the factors, which may mean that it is not related to the Perrow technology construct.

Convergent and Discriminant Validity

The next part of the analysis concerns the eight subscales that attempt to measure both dimensions of Perrow's model. Correlation coefficients were calculated among the 8 subscales using the mean scores for each of the 23 work units. Table 2 contains these coefficients arranged in the form of a multitrait-multimethod matrix (Campbell & Fiske, 1959). Separate questionnaire scales do not represent true multiple methods, but this analysis enables an assessment of whether the scales converge and discriminate for the two technology dimensions.

The test of convergent validity is that different measures of the same dimension correlate positively. The results show that convergent validity is high, with all 12 of the relevant correlations significantly positive.

There are two relevant tests for discriminant validity for this set of data: (1) The agreement among different subscales purportedly measuring the same dimension should be higher than agreement within scales that purport to measure different dimensions; this condition is observed in 19 of the 24 cases (sign test $p = .003$). (2) Agreement among different subscales

Table 2
Multitrait-Multimethod Correlation Matrix[a]
($N = 23$)

		Van de Ven & Delbecq		*Van de Ven & Ferry*		*Daft & Macintosh*		*Lynch*	
		E	*A*	*E*	*A*	*E*	*A*	*E*	*A*
Van de Ven & Delbecq	E	(.51)							
	A	.80[b]	(.68)						
Van de Ven & Ferry	E	.88	.78	(.75)					
	A	.64	.87	.74	(.78)				
Daft & Macintosh	E	.88	.69	.75	.54	(.68)			
	A	.76	.80	.69	.66	.60	(.73)		
Lynch	E	.65	.62	.64	.57	.75	.40	(.54)	
	A	.46	.68	.49	.52	.32	.61	.11	(.38)

[a]E = exceptions, A = analyzability. Numbers in parentheses are split-half measures of reliability.
[b]With df = 21, $p = .05$ at $r = .35$; $p = .01$ at $r = .48$; $p = .005$ at $r = .53$.

measuring the same dimension should be higher than agreement among different subscales measuring different dimensions; this is observed in 22 of the 24 cases (sign test $p = .001$).

The data in Table 2 thus indicate respectable convergent and discriminant validity for Perrow's two technology dimensions. Taken together the Table 1 and Table 2 findings suggest that the two dimensions described by Perrow were perceived by members of these work units, and that the scales designed to tap these two dimensions converge on and discriminate work unit technology at a level acceptable for research.

An additional test of convergent and discriminant validity is provided by correlating the scales with the JCI scale (Sims, Szilagyi, & Keller, 1976), a validated measure of task variety. A scale purporting to measure the exceptions dimension of Perrow's model should correlate highly with the JCI, and the analyzability dimension should have a lower correlation. This was the case for all four of the two-dimensional scales (Table 3, Part 1). A low to moderate correlation between the analyzability subscales and the JCI variety scale is also present, reflecting the empirical overlap between the analyzability and exceptions dimensions of technology noted by Perrow.

Table 3
Correlations of Technology Scales with Other Measures[a]
($N = 23$)

		Van de Ven & Delbecq	*Van de Ven & Ferry*	*Daft & Macintosh*	*Lynch*	*Hage & Aiken*	*Glisson*
1. Correlation with JCI	E	.90	.71	.83	.61	.90	.55
	A	.54	.42	.58	.20		
2. Supervisor-subordinate agreement							
Convergent	E	.62	.14	.40	.54	.55	.28
	A	.64	.09	.27	.11		
Discriminant[b]	X	2/4	2/4	2/4	2/4	—	—
	Y	4/4	2/4	3/4	3/4	—	—
3. Mean correlation with other scales, supervisor responses							
Convergent	E	.80	.76	.81	.68	—	—
	A	.78	.68	.69	.50	—	—
Discriminant[b]	X	10/12	9/12	11/12	8/12	—	—
	Y	12/12	10/12	11/12	11/12	—	—
4. Agreement with external raters	E	.62	.48	.71	.59	—	—
	A	.45	.34	.46	.21	—	—
5. Internal consistency	E	.51	.75	.69	.54	.71	.34
	A	.68	.78	.73	.38		
Correlation between dimensions		.80	.74	.60	.11	—	—

[a] E = exceptions; A = analyzability. Results are reported using subordinate responses unless otherwise noted. X = number of cases where monotrait/heteromethod correlations exceed corresponding heterotrait/monomethod correlations (Campbell & Fiske, 1959). Y = number of cases where monotrait/heteromethod correlations exceed corresponding heterotrait/heteromethod correlations.

[b] Represents proportion of all possible two-way comparisons that are in the expected direction.

Hage and Aiken's scale correlated very highly ($r = .90$) with the JCI, further supporting the view that this scale primarily reflects the exceptions dimension of Perrow's model.

Convergent and discriminant validity also were assessed using correlations between supervisor and subordinate responses; results are shown in Table 3, Part 2. The Van de Ven and Delbecq subscales show moderately high convergent validity, the Lynch and the Daft and Macintosh exceptions subscales show moderate convergence, while the coefficients for the other four subscales are negligible.

The supervisors' responses on the scales also were compared to one another (Table 3, Part 3). The correlations generally are strong and support the interpretation that the measures of each dimension are tapping similar phenomena.

An External Test

The scales were assessed further against the external raters' evaluations of the work units, which were not based on questionnaire responses. The coefficients in Table 3, Part 4, indicate moderately high levels of agreement between external ratings and the exceptions subscales. The Daft and Macintosh exceptions subscale shows the highest agreement ($r = .71$), and the Van de Ven and Ferry subscale the lowest ($r = .48$). The correlations between raters and scales is only modest for the analyzability dimension, with the Van de Ven and Delbecq ($r = .45$) and Daft and Macintosh subscales ($r = .46$) showing the highest levels of agreement.

Reliability

The internal consistencies and the correlations between dimensions also were assessed for each scale. If the scale discriminates well between the two dimensions and if there is internal consistency, the interdimensional correlation should be smaller than the internal consistency value. The Daft and Macintosh subscales performed best on this criterion (Table 3, Part 5). The Van de Ven and Delbecq subscales show moderately high internal consistency, but the within-scale consistency is lower than the correlation between dimensions.

Discrimination Among Work Units

The findings to this point indicate that the technology scales seem to converge and discriminate along the lines of Perrow's technology framework. The final part of the comparative analysis tests the ability of the scales to discriminate among work units. The expectation for these scales is that responses within the units are homogeneous and different from the other units; the null hypothesis is that all individuals are responding to the same work unit technology. Response variation was tested with one-way analysis of variance for each subscale. Table 4 (Columns 1 and 2) indicates that the null

Table 4
Analysis of Variance and Covariance

		Analysis of Variance		Analysis of Covariance			
				Covariate Effect		Main Effect	
	Subscale	(1) F value	(2) P value*	(3) F value	(4) P value**	(5) F value	(6) P value***
Van de Ven & Delbecq	Variability	4.22	.00001	69.19	.00001	1.97	.01
	Difficulty	5.02	.00001	74.91	.00001	2.63	.0001
Van de Ven & Ferry	Variability	3.71	.00001	103.86	.00001	2.18	.004
	Difficulty	3.80	.00001	102.59	.00001	2.08	.006
Daft & Macintosh	Variety	3.52	.00001	28.40	.00001	2.49	.001
	Analyzability	5.68	.00001	33.14	.00001	3.91	.0001
Lynch	Routine	2.04	.007	.66	n.s.	2.02	.008
	Predictability	1.73	.03	.64	n.s.	1.70	.035
	Insufficient knowledge	1.24	.22	—	—	—	—
Hage & Aiken		2.96	.0001	—	—	—	—
Glisson		2.27	.002	—	—	—	—
JCI		2.91	.0001	—	—	—	—

*df = 22,146
**df = 1,145
***df = 22,145

hypothesis is rejected for most of the subscales. The ability to discriminate among units differs somewhat by subscale, but responses to all but the Lynch insufficient knowledge subscale discriminated sufficiently to reject the null hypothesis (Table 4, Column 2).

A more stringent test of the ability to discriminate among work units is analysis of covariance, which assesses the ability of a subscale to discriminate among work units after the effect of covariation with the other dimension has been removed. This test is important because the two dimensions tend to covary across work units.

The results in Table 4 (Columns 5 and 6) indicate that each of the subscales continues to discriminate among work units, even when the other dimension is controlled. The Daft and Macintosh subscales show the strongest results, and the Lynch scales show the weakest results. These findings support the argument that respondents perceived the two technology dimensions with meaningful between-unit variance remaining even after the other technology dimension was controlled for.

Summary of Instrument Characteristics

Van de Ven and Delbecq. This appears to be one of the better instruments for measuring Perrow's technology variables. The exceptions dimension correlated highly with the JCI measure of variety. The scales showed substantial agreement with external raters and moderately high internal consistency. The only problem with this scale concerns the strong correlation between dimensions ($r = .80$), which was higher than the internal consistency of the subscales. Despite the high interscale correlation, the subscales discriminated among work units, even when the covariate was controlled.

Van de Ven and Ferry. This scale had somewhat lower correlations with the JCI and with external raters than did the Van de Ven and Delbecq scale. The correlation between dimensions was quite high, but the subscales nevertheless discriminated among work units, although less well than did the Van de Ven and Delbecq and the Daft and Macintosh scales. There was almost no agreement between supervisor and subordinates. Generally this scale appears to be acceptable for research based on Perrow's model, but it did not perform as well as did the Van de Ven and Delbecq and the Daft and Macintosh scales.

Daft and Macintosh. This also appears to be one of the better instruments. It had acceptable correlations with both the JCI and with the external raters. Internal consistency was high, but supervisor-subordinate agreement was only moderate. The strength of this scale was that it scored well on most convergent criteria. The correlation between the exceptions and analyzability dimensions ($r = .60$) was lower than in the Van de Ven and Delbecq scale, which enabled somewhat better discrimination across work units in the analysis of covariance tests. Convergent validity, however, was somewhat weaker than for the Van de Ven and Delbecq scale.

Lynch. The first two dimensions seem related to the two dimensions described by Perrow, but the third dimension was unrelated to Perrow's technology construct. Internal consistency was modest, as was supervisor-subordinate agreement for the exceptions dimension. The analyzability dimension did not discriminate well in the analysis of covariance test. The scale does not appear to be as effective for measuring Perrow's dimensions as other instruments.

Hage and Aiken. This scale seems to measure the exceptions or variety dimension of Perrow's technology model. It correlated highly with the JCI measure of variety and showed good internal consistency. The scale also showed supervisor-subordinate agreement, and it discriminated among work units.

Glisson. The Glisson scale showed only moderate correlations with other measures of the two dimensions. Internal consistency was fairly low and supervisor-subordinate agreement was low to moderate. The scale discriminated among work units, but less well than other scales. Other technology scales generally would be preferred to this one.

A New Technology Instrument

No single scale emerged as clearly superior to the others. Two scales (Van de Ven and Delbecq, Daft and Macintosh) seem most appropriate for future research because both operationalize the two Perrow dimensions and have reasonable measurement properties. However, each has weak points as well, so a refined scale was constructed from the pool of 50 items in an effort to overcome the deficiencies of the existing scales.

The new exceptions and analyzability subscales were developed using three criteria: face validity, factor structure, and the ability to differentiate among work units. The first two criteria reflected a concern that the refined scales must clearly operationalize the two theoretical dimensions, rather than related constructs such as standardization, length of feedback cycle, and so on. Items were eliminated that did not clearly represent the two theoretical domains, regardless of how well they differentiated among work units. This procedure explicitly rejected raw empiricism in scale construction. The sample of items meeting this criterion was reduced further by eliminating items that did not differentiate among work units, using one-way analysis of variance. Items that survived the face validity and ANOVA tests then were submitted to a confirmatory factor analysis, with items eliminated that failed to load most heavily on the a priori defined factor. The refined subscales then were assessed using analyses of variance and covariance procedures.

These procedures produced the new exceptions and analyzability subscales shown in Table 5. The factor structure reflects the two theoretical dimensions, and the items have high face validity. Analyses of variance and covariance using the refined scales showed them to differentiate among work units somewhat better than most of the existing scales. Additional tests served as further checks on the scales (Tables 5 and 6). Correlations with

the JCI scale were equivalent to or better than existing scales ($r = .87$ and .58 for exceptions and analyzability). Convergent validity for the new exceptions scale was higher than existing scales on the supervisor-subordinate data, but the analyzability subscale value was not as high as the Van de Ven and Delbecq subscale. Convergence and discrimination tests with other

Table 5
Items and Statistical Coefficients for Refined Scales ($N = 169$)

Item and Source[a]	*Factor*	
	Exceptions	*Analyzability*
How many of these tasks are the same from day-to-day? (very few... most of them). VV80	.67	.47
To what extent would you say your work is routine? VV74; DM	.86	.40
People in this unit do about the same job in the same way most of the time. VV74	.75	.53
Basically, unit members perform repetitive activities in doing their jobs. VV74	.81	.44
How repetitious are your duties? (Very little...very much) JCI	.76	.32
To what extent is there a clearly known way to do the major types of work you normally encounter? VV80	.44	.79
To what extent is there a clearly defined body of knowledge of subject matter which can guide you in doing your work? VV74	.21	.60
To what extent is there an understandable sequence of steps that can be followed in doing your work? VV74	.59	.73
To do your work, to what extent can you actually rely on established procedures and practices? DM	.53	.57
To what extent is there an understandable sequence of steps that can be followed in carrying out your work? DM	.48	.62
Cronbach alpha	.81	.85
Interscale correlation	.79	
ANOVA F (22, 146)	7.27	5.02
ANCOVA F (22, 145)	3.95	2.25

[a]Sources: VV74 = Van de Ven & Delbecq (1974); VV80 = Van de Ven & Ferry (1980); JCI = Sims, Szilagyi, & Keller, (1976); DM = Daft & Macintosh (1981). Items are on a "to a small extent...to a great extent" scale unless otherwise noted. Underlined item loadings indicate item classifications for two scales.

Table 6
Summary of Values for Refined Scales ($N = 23$)

	Exceptions	*Analyzability*
Correlation with JCI	.87	.58
Subordinate-supervisor agreement		
Convergent	.65	.21
Discriminant	1/4	2/4
Agreement with other scales		
Convergent	.83	.85
Discriminant	14/16	16/16
Agreement with external raters	.59	.49

scales were very good, in part because they shared items. Agreement with external raters also was generally equivalent to values found in the better existing scales ($r = .59$ and .49 for exceptions and analyzability). Finally, the internal consistency values were higher than existing scales because the new scales were constructed to reflect homogeneously the respective dimensions ($r = .81$ and .85, Table 5).

One weakness of the refined scale is that the analyzability subscale differentiated among work units less well than did the exceptions subscale. This is partly because the analyzability dimension is more elusive and difficult to measure than the exceptions dimension. The new analyzability scale also has a slightly smaller *F*-value than two of the existing scales in analysis of covariance. The new scale was constructed to reflect dimension homogeneity, but at the slight expense of the ability of one subscale to differentiate among units. However, the analyses of variance and covariance indicate that the new scale is very acceptable for organizational research and is an improvement over existing scales on most criteria.

The use of the new scales can be seen by examining a representative unit from each quadrant in Perrow's model, as identified by the refined scale. The scatterplot of units formed an elliptical pattern very similar to the pattern reported in the work unit classification described by Van de Ven and Delbecq (1974). Most units were located in the routine and nonroutine portions of the grid, which reflects the positive correlation between dimensions. The computer operations department had the lowest scores for exceptions ($\overline{X} = 2.4$) and analyzability ($\overline{X} = 2.3$). Work in this routine unit was characterized by activities such as fetching and mounting tapes and setting up printers. The most extreme unit in the nonroutine quadrant was the methodology department (exceptions $\overline{X} = 5.3$, analyzability $\overline{X} = 4.4$), whose work dealt with survey development, designing specifications for surveys, and other research. The training package development group (exceptions $\overline{X} = 3.9$, analyzability $\overline{X} = 3.2$) was in the engineering quadrant. This group rewrote existing materials and updated training manuals, which was well understood work but contained exceptions. The systems analysis unit was representative of craft technology (exceptions $\overline{X} = 4.2$, analyzability $\overline{X} = 2.7$); this group customized computer systems for users.

Discussion

This exploratory study was undertaken to answer three basic questions: To what extent does a sample of technology scales measure the same phenomena? Are any of the scales superior? Can an improved scale be developed? The results provide tentative answers: substantial convergence was found among measures, two previous scales were quite good, and it was possible to develop a conceptually and empirically improved scale. Future technology research may be able to assess the degree to which the properties of the new technology instrument hold up in other samples.

The positive correlations among separate measures of Perrow's model were stronger than initial expectations. The criticism of unrationalized categorization was not supported for those scales developed to assess both dimensions of Perrow's model. Each questionnaire instrument tended to use different items, but the scales still measured similar phenomena in this sample of work units. As a result of this similarity, findings about the relationship between technology and other work unit characteristics would tend to be comparable and cumulative. These data suggest that something called "analyzability" and "exceptions" can be defined and operationalized across organization work units using questionnaire methodology. The "exceptions" scales tended to correlate more highly across studies than did the "analyzability" scales. But measures of both constructs had reasonable measurement properties and could differentiate among work units in the analyses of variance and covariance.

The results from this measurement oriented research suggest a note of encouragement for organizational studies. Measurement inconsistency has been a problem, but it may not be as great for work unit technology as for other elements of structure. Investigators working on projects linked by common conceptual interests may be developing knowledge that contributes to a common pool, despite differences in the operationalization of the technology construct.

One suggestion from this study is that researchers using Perrow's model adopt the Van de Ven and Delbecq scales, the Daft and Macintosh scales, or the new scales proposed in Table 5. These scales display reasonable psychometric properties and are conceptually close to the analyzability and exceptions dimensions. Research findings from these scales are more likely to be comparable to other research based on Perrow's dimensions of technology. Of course, results here are very tentative, and any recommendation is made within strict limitations. The study was conducted at the work unit level of analysis. Hence it does not provide information about organization level technologies. Further, the sample was relatively small and included work units from a single large organization. Additional research must be undertaken before these results can be generalized to other organization settings.

Another suggestion is that investigators may want to operationalize both technology dimensions if their research is based on Perrow's theoretical concepts. The conceptual underpinning for a single dimension is questioned by the analysis of covariance results because meaningful between-unit variance remained after controlling for the other dimension. A single technology dimension would miss this interpretable variation. In addition, the analyzability and exceptions dimensions may have unique theoretical and empirical relationships with other work unit characteristics. For example, Daft and Macintosh (1981) reported that the two dimensions had distinct relationships with the ways in which managers processed information, and Van de Ven and Delbecq (1974) found that each dimension performed a different function in their classification scheme. Additional studies also

have found different correlations with each theoretical construct (Van de Ven & Ferry, 1980; Van de Ven et al., 1974). These findings suggest that Perrow's technology concept is theoretically richer when both dimensions are used.

A useful extension of the present study would be to compare the superior questionnaire scales identified here with other measures of technology, such as with qualitative data, or with institutional measures (Ford, 1979; Pennings, 1973; Sathe, 1978). The research reported here is only a first step, but the findings seem promising for the measurement of work-unit technology. If additional measurement progress can be made, future research may not have to struggle with the same old measurement problems. Measurement problems will never be completely resolved, but movement toward generally accepted measures may enable organization scholars to concentrate more on the development and refinement of new theories, which, after all, are the reasons for doing organizational research.

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Mobility Influences During Managerial Career Stages[1]

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A multivariate framework was used to determine the impact of 22 individual/career related factors on career mobility. Career mobility was represented by two criterion variables, rate of movement and propensity to move. Several of the 22 factors were found to explain substantial portions of variance in both criterion variables.

Why are some managers more mobile than others? To date, this question has been explored in the contemporary literature most notably by Jennings, (1976, 1970, 1971), Maccoby (1976), and Packard (1962). However, other than the classic study done on the careers of American business elite by Warner and Abegglen (1955), there exists a paucity of empirical research on factors that influence managerial career mobility.

Historically, career mobility has been defined in a variety of ways. Two of the most common conceptualizations are rate of movement and willingness or propensity to make a move, given the opportunity (Parnes, 1954). In much of the popular literature, rate of movement and propensity to move have been treated as synonymous (Jennings, 1970, 1971), and yet some evidence suggests that they may be unrelated. Read (1962) found that mobility aspiration was only weakly correlated with work-life mobility. Grusky (1966) discovered that managers who had been the most mobile during their careers also expressed the greatest loyalty to the firm, suggesting that rate of movement and propensity to move may be inversely related.

Although rate of movement has been the focus of some research, there is no consensus or uniformity in how it has been operationally defined. In studies of executives, mobility has been inferred from the executive's location in the hierarchy (Jennings, 1967; Maccoby, 1976; Warner & Abegglen, 1955). Efforts also have been made to measure mobility rates by counting the number of levels in an organization an individual has risen (Gould, 1979; Grusky, 1966) or the number of occupational levels, as defined by the U.S. Census code, that an individual has risen (Read, 1962). Executive mobility studies also have examined the number of moves to other

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companies that executives made, as a means of differentiating varying rates of mobility (Bond & Swinyard, 1971; Johnston, 1977; Roche, 1975; Warner & Abegglen, 1955).

Martin and Strauss have pointed out that "the speed at which individuals move along specific career lines tends to follow fairly identifiable timetables" (1956, p. 103). Jennings (1970) carries this point of view further by suggesting that frequency of movement is an accurate predictor of the approximate level of management an individual is likely to reach. Consistent with this perspective and the one used in this study is the emphasis on the pacing and timing of mobility events by Becker and Strauss (1956), an area in which little research has been done (Rosenbaum, 1979). In the present study, average time per position was chosen as the operational definition of rate of movement because it provides a standardized and objective basis for measuring a manager's mobility disposition.

Propensity to move, a more subjective measure of a manager's mobility disposition, has received some attention, although this has been largely within the context of research on organizational commitment (Dubin, Champoux, & Porter, 1975; Grusky, 1966; Hrebiniak & Alutto, 1972; Stevens, Beyer, & Trice, 1978). However, to date there still exists considerable disagreement as to how to define commitment operationally (Stevens et al., 1978). Dubin et al. (1975) have emphasized the more psychological nature of commitment, such as the individual's acceptance of goals and values of the organization. Grusky (1966) and Hrebiniak and Alutto (1972) have stressed the perceived utility of continued participation in the employing organization. The latter view of organizational commitment is most closely aligned with the concept of propensity to move that will be used in this study. Hence, one purpose of this research is to examine both concepts of career mobility and to determine whether or not they are influenced by a common set of individual/career related factors during three work/career stages.

Work/Career Stages

Any research on career mobility would be incomplete without accounting for the moderating effects of work/career stage. Several models of career development exist, many of which depict stages of life from birth to death (Erickson, 1963; Gould, 1972, 1978; Hall & Nougaim, 1968; Levinson, 1978; Miller & Form, 1951; Schein, 1971, 1978; Super, Crites, Hummel, Moser, Overstreet, & Warnath, 1957; Vaillant, 1977; Veiga, 1973). Such models generally attempt to identify major periods of one's life or career by utilizing specific age ranges. Most researchers have found that such stages can be roughly correlated with age (Schein, 1978).

Although it appears that several competing models exist, each represents different perspectives on the stages of adult and/or career development. Schein (1978) identifies the three most common perspectives found in most adult developmental models: (1) biosocial life cycles, (2) work/career cycles, and (3) family or procreation cycles.

Of these, the most popular has been the biosocial perspective, as in Levinson's (1978) and Gould's (1978) works. Such models attempt to explore the overall life cycle of the typical adult and pinpoint specific transitional periods that result from age-related biological changes or powerful cultural norms called life "crises." Unfortunately, this perspective does not always appear to coincide with the reality of a corporate career. Davis and Gould argue that "the situational reality of the corporation and the psychic reality of the mid-life passage are distinct" (1981, p. 123). Thus, a manager could be experiencing a mid-life crisis during a period of rapid upward career mobility or slowed lateral movement.

Given this distinction, a more appropriate line of inquiry, with respect to exploring career mobility, seemed to be the work/career perspective. Hall and Nougaim (1968) propose a career model that identifies three stages relevant to a managerial career—establishment (age 25-30); advancement (age 30-45); and maintenance (age 45-65). Super et al. (1957) propose a two-stage model—establishment (age 25-45) and maintenance (age 45-65). The Veiga model (1971, 1973), chosen for use in the present study, identifies three phases of a managerial career—corporate learning (age 29-37); corporate maturity (age 38-55); and the gold watch or preretirement phase (age 56-64). To date, little research has been done to validate any of these models. However, Veiga (1971, 1973) was able to identify three stages during a managerial career during which mobility was either increasing or decreasing at a faster rate using linear regression. He then was able to validate these stages using the Scheffé (1969) a posteriori contrast test at the .05 level. Veiga (1971, 1973) found that although the rate of career mobility continues to decrease throughout the managerial career, from age 29 to 37 it decreases at a significantly faster rate. During this stage the new manager is "learning" the ropes and establishing a track record—corporate movement has slowed some as the new manager gains some seasoning.

From age 38 to 55 the seasoned manager enters the corporate mainstream (Veiga, 1973). During this phase mobility begins to decrease at a decreasing rate, thus reflecting increased movement activity as the "mature corporate talent" begins to experience more frequent lateral mobility and relocation. In the third career stage, age 56-64, mobility again begins to decrease at an increasing rate, reflecting an exiting out of the corporate mainstream and the placing of the manager in a "preretirement" holding pattern (Roche, 1979; Veiga, 1981a).

Veiga (1971, 1973) saw these stages of increasing and decreasing mobility as being predicated largely on corporate needs and the nature of organization structure. Schein (1971) has maintained a similar view. But he also has suggested that "careers can be aborted, truncated, changed, leveled off, and in other ways manipulated by the individual" (1978, p. 36). Hence, a second purpose of this research is to determine the extent to which these stages also represent unique periods of a managerial career in which individual/career related factors influence career mobility.

Individual/Career Related Factors

Throughout a managerial career there are a variety of ever-changing factors that impinge on an individual's career choices (Beckhard, 1977; Sarason, 1977; Schein, 1978; Slocum, 1974; Sofer, 1970; Tausky & Dubin, 1965; Veiga, 1973; Wilensky, 1968). To date, however, little empirical work has been directed at substantiating these forces and determining the degree to which they influence career mobility. This is especially true with regard to identifying the influences of what Van Maanen (1977) calls individual or "internal factors" that shape career outcomes, such as career and work related perceptions, as well as contextual factors, such as level of exposure to top management (Jennings, 1967; Maccoby, 1976). Initially, a review of the literature suggested three types of individual factors that affect career mobility: (1) those associated with barriers to moving to another company or another geographic location, (2) those linked with the career path chosen, and (3) those that underlie a manager's motives for wanting to move. Ultimately selected for study were 22 factors, primarily because of their theoretical or empirical relevance to the concept of career mobility.

Barriers to Moving

There are several potential obstacles to a manager's considering the prospect of moving to another company. Hall points out that as a manager ages, "the person feels less mobile and attractive in the job market and therefore more concerned about job security" (1976, p. 83). Perceiving oneself as less attractive or marketable can serve as a strong deterrent to exploring career opportunities in other firms, which, in turn, also could reduce the potential for leveraging in one's present position. A second obstacle, according to Albrook (1968), is the corporate fringe benefits and pension programs that tend to "fence in" those who might otherwise be mobile. If a manager places a high value on company benefits, the likelihood of leaving, or even considering leaving, becomes more remote. A third obstacle, defined by Schein (1978) as a "career anchor," is the value managers place on job security and stability. As with fringe benefits, placing a high value on employment stability is likely to constrain one's desire and ability to move.

Besides the obstacles to moving to another company, there also are barriers associated with making a move to another geographic location—the most obvious being community ties. Lansing and Mueller (1967) found that community ties, such as relatives and friends living in the same area and desirability of location, had a significant negative impact on an individual's mobility. In addition, Schein (1978) and Hall (1976) suggest that married people with children go through life stages that may be in conflict with the career aspirations of the parents. Recently, the emergence of the dual-career couple (Hall & Hall, 1978) also has been suggested as a deterrent to career mobility because the spouse may be tied to a particular location

reflecting his or her particular career needs. Thus, how managers perceived their own community ties is not the only consideration in a geographic move—how they perceive the community ties of their spouses and children may be barriers as well.

Career Path Factors

One dimension of a career path that seems to relate to career mobility is how the path began. According to Berlew and Hall (1966), a company's initial expectations of new managers has a considerable impact on their subsequent performance and success. Schein (1963, 1964) also recognizes the crucial nature of the first job assignment, suggesting that this period may well be a test of how the individual will conduct his or her subsequent career. For MBAs, Schein (1963, 1964) found that highly mobile managers were the most prone to move out or be promoted from their first job within one to two years. These findings suggest that the length of time that managers spend in the first position could have a strong influence on their subsequent mobility disposition.

A second dimension of a career path, which relates to career mobility, deals with the nature of the path chosen. According to Jennings (1967, 1971) and Packard (1962), the mobile manager is careful to avoid career choices that lead to dead-end career paths. The mobile manager chooses a path that offers a wide set of career options within the organization, seeks a path that affords high levels of exposure and visibility, and is careful to follow in the path of a superior who has been highly mobile.

Motives for Moving

There are many reasons why a manager desires to move—be it up or out. Jennings (1967, 1972) and Packard (1962) have portrayed the mobile manager as having a unique perspective on career mobility. Both Jennings (1967) and Veiga (1981a) suggest that the desire for movement may be learned. Veiga (1981a) suggests that managers use their rate of mobility as a measure of success. Hence, underlying much of managers' desires to keep moving may be what Levinson refers to as a "continuous threat of defeat" and a "constant state of defensiveness" (1969, pp. 52-53). In support of this perspective, Veiga (1981b) identified two career motives that he believes are central to a manager's desire for movement: fear of stagnation and career impatience. Besides these two more internalized motives, managers also suggest a variety of reasons for why they choose to move or have a desire to move. Friedlander and Walton (1964) found that the reasons managers stay with an organization are quite different from those that might cause them to leave. Their findings suggest that managers stay primarily for "work process" reasons—essentially, sources of job satisfaction (Herzberg, 1966; Herzberg, Mausner, & Snyderman, 1959)—and leave primarily for "work context" reasons (essentially Herzberg's sources of job dissatisfaction).

Research Questions

Scant empirical evidence exists that links work/career stages with the relative impact of specific career factors on career mobility. Ideally, a longitudinal study is necessary if there is to be a full understanding of the dynamics of managerial careers. Nevertheless, some preliminary work using a multivariate design is called for because of the scarcity of information available. At a minimum, there is a need to explore the extent to which individual factors that shape a career, and are generally treated independently, simultaneously impact on rate of movement and propensity to move—an issue that bivariate techniques cannot assess. Second, there is a need to examine the extent to which these forces are more pronounced during specific stages. Such an effort not only could provide important insights into the nature of managerial careers, but it also could prove to be of considerable value to those who must counsel managers at various career stages.

Hence, the major research issue involved two questions. First, to what degree would a common set of individual/career related factors predict rate of movement and propensity to move? Second, to what extent would such predictions be sensitive to differences in the work/career stage of the individual? The first question is important because of the lack of research aimed at providing support for the postulated relationships between such factors and career mobility. Moreover, the importance of work/career stage as a moderating variable seems especially salient when dealing primarily with factors that are based largely on managerial perceptions.

The second research question involved two dimensions. The first dimension consisted of an assessment of the extent to which the addition of work/career stage information would make a significant contribution to explained variation in each of the two criterion variables beyond that explained by the set of career related factors alone. The second dimension of the question addressed whether separate multivariate predictive models based on work/career stage groupings would significantly improve the variation explained in each criterion variable over that derived from a common, or aggregate, regression solution in which work/career stages were represented by dummy variables.

Method

Subjects and Procedures

The subjects for this study were managers from three major U.S. corporations. The three corporations were selected for several reasons. First, they were all in the same manufacturing industry; thus there was control for differences in industry growth rates. Second, each employed over 100,000 people and had between 530 and 600 people in middle management positions; thus there was control for organization size and structure differences. And, third, each company had between 41 and 54 domestic plant locations

from which subjects could be drawn; thus the companies provided similar career opportunities in a variety of geographic locations.

For purposes of this study, middle management was defined as individuals above first line supervision and below the level of vice-president who had direct supervisory responsibility for other managers or technical personnel. The 1,733 managers who fit this description were all mailed a lengthy career history and career attitude survey. Respondents were guaranteed anonymity. After one follow-up mailing, a total of 1,294 questionnaires were returned, representing a 75 percent rate of return overall. A total of 78 questionnaires were not used because of incomplete data, resulting in an N of 1,216.

Subjects ranged in age from 29 to 64, with a mean age of 47. All respondents were college educated, 97 percent were married, 93 percent had families, and there was mean of 2.6 children per family. The subjects managed all functions of the firm. The largest group was in marketing and sales (29 percent).

Measures of Career Mobility

Respondents provided complete job histories from the beginning of their careers until present. This included length of time in each position (in years), the direction of each move—upward (increased responsibility), lateral (same level of responsibility), and downward (decreased responsibility)—and the types of moves made (changed companies, geographic transfer, or new position at the same location).

Average time per position was determined by averaging the stay times reported for all positions held since the beginning of each subject's career except the first position. The first position was excluded from this calculation so that time in the first position could be included as one of the independent variables in the regression analysis. The correlation between average time per position (first position excluded) and average time per position (first position included) was .91 ($p < .001$), suggesting that little data was lost by excluding the first position.

An additional attempt to differentiate mobility disposition into intraorganizational moves and interorganization organizational moves was not pursued because it was found that 90 percent of all moves were within the same company and less than 25 percent of all managers surveyed reported making an interorganizational move. The findings suggested that the variety of career decisions, such as change of companies and relocation, that a manager confronts during his or her career are inextricably woven into a pattern of moves that is not always evident in a career history. For example, a manager may begin to pursue a more attractive position in another company, which leads to discussions with the present employer in which he or she is offered increased responsibility or a move to a more promising division. Hence, as Rosenbaum (1979) has pointed out, a major dimension of mobility disposition is the overall timing of mobility events that average time per position represents.

Propensity to move was measured by asking subjects to answer a question that was a slight modification of Grusky's (1966) measure of commitment: "Suppose you were offered a job with another company that was better than the one you have now. Assuming the move would not require a change in geographical location, how willing would you be to move?" Respondents were directed to respond to five alternatives arrayed on a 5-point scale: (1) "Would *not* move," (2) "Would probably *not* move," (3) "Unsure," (4) "Might move," (5) "Would definitely move."

Measures of Individual/Career Related Factors

Barriers to Moving. This category included six factors. Marketability was determined by asking subjects to rate their chances of obtaining a position in another company as good as their present one on a scale from 0 (no chance) to 100 percent (excellent chance). Value of company benefits and the importance of job security were both measured on a 5-point scale from a "minimum" of 1 to a "maximum" of 5. During the presurvey interviews, 53 managers also were asked to help develop and refine a list of reasons why managers are unwilling to leave a community. After factor analyzing a list of 23 items, 3 themes (self, spouse, and children) were found that were represented by a total of 16 items. Respondents were asked to assess the impact of each reason on their decision to relocate on a 5-point scale from 1, "no effect," to 5, "substantial effect." Seven of the items, which related to the manager's own reasons for not wanting to relocate, such as "I really like this part of the country," were summed as one measure. Six items, which related to a manager's spouse being a reason for not relocating, such as "My spouse's work is here," were summed as a second measure. The three items related to a manager's children being a reason for not relocating, such as "My kids are of an age where they would be hurt socially," were summed as the third measure of community ties. Coefficient alpha for the three measures were: own (.79), spouse (.50), and children (.72).

Career Path Factors. This category involved four factors. Time in first position was taken from the career history reports. Predecessor's stay time was determined by asking respondents to indicate how many years their predecessors held the job they now hold and the type of move their predecessors made when they exited. The predecessor's length of stay, in years, was inversely weighted by multiplying it by a 1 (if the exit was upward), a 2 (if the exit was lateral or to another company), and a 3 (if the exit was downward or to retirement) to reflect the decreasing likelihood for upward mobility. Available career options were measured by asking respondents to indicate the number of positions they could be asked to fill, at their level or above, in their company if a vacancy existed. Level of exposure/visibility was measured by asking respondents first to estimate the percentage of time per week they were involved in projects that gave them exposure to top management. And, second, they were asked to indicate how visible they were to upper management by estimating the amount of direct feedback



for their efforts they received from top management on a 5-point scale of "never" (0 percent) to "always" (100 percent). These two percentages were multiplied together and then multiplied by 100 to create a final index ranging from 0 to 100.

Motives for Moving. This category includes twelve factors. Fear of stagnation was measured using a 4-item scale validated by Veiga (1971, 1981b). The scale examines the extent to which managers are unwilling to accept career plateauing; e.g., "Since all managers cannot reach the top, it's best to be satisfied with a middle level position rather than to frustrate oneself trying to reach the top." Subjects responded to items on a 7-point Likert-type pattern ranging from strongly agree to strongly disagree. Statements were reversed and randomly dispersed throughout the questionnaire to avoid artificially high reliabilities due to the grouping of like items. Coefficient alpha for this scale was .70. Career impatience was measured using a 3-item Likert-type scale validated by Veiga (1971, 1981b). This scale examines the extent to which managers are unwilling to be patient with their career progress; for example, "Promotions should be largely a matter of seniority and experience and thus one should wait his turn." Coefficient alpha for this scale was .85. Satisfaction with each of Herzberg's (1966, 1968) motivation-hygiene factors (achievement, recognition, advancement, responsibility, work itself, salary, co-workers, supervisor-human relations, supervisor-technical competence, and company policies and practices) was measured using a 2-item, 7-point Likert scale. The items were developed originally in a study by Dunnette, Campbell, and Hakel (1969), in which they reported using a *Q*-sort to develop statements, representing the Herzberg factors, so as to minimize the influences of social desirability. The two statements from their study with the highest factor loading for each factor were selected for inclusion, one negatively worded and one positively worded.

In addition to demographic characteristics, data were gathered on salary level and functional area. Managers were asked to indicate their functional area from a list of six: finance/accounting, personnel/labor relations, marketing and sales, production, research and development, and engineering. Given corporate sensitivity to gathering and publishing salary information, it was agreed to publish information based on a predetermined salary grade index. Salaries were categorized using $5,000 increments beyond a fixed base amount. This resulted in a total of nine salary grades with a 9 representing the top grade. These items were used to check for spurious relationships before the regression analyses were done.

Analysis

The first issue that had to be addressed, before proceeding to the main research questions, concerned possible spurious effects of the independent variables that could interfere with regression analysis. In this regard, the primary concern dealt with issues of multicollinearity. The average intercorrelation between the independent variables was .13, ranging from .00

to a high of .33, therefore reducing the potential for complications in interpreting regression results.

The second issue of concern was the possible spurious relationships of salary grade and functional area with the criterion variables. Given the nominal nature of functional area categories, a separate analysis was done. The means, by functional group, for average time per position and propensity

Table 1
Descriptive Characteristics of Study Variables and Correlations with Career Mobility Measures

	Work/Career Stages						*Pearson Correlations (N=1,216)*	
	Learning (age 29-37) (N=194)		*Maturity (age 38-55) (N=785)*		*Preretirement (age 56-64) (N=237)*			
Variable	$\bar{X}$	*S.D.*	$\bar{X}$	*S.D.*	$\bar{X}$	*S.D.*	*Average Time per Position*	*Propensity to Move*
Barriers to moving								
Marketability	80.62	20.03	70.32	24.72	49.26	28.41	-.23**	.21**
Value of company benefits	3.52	1.09	3.84	1.05	4.51	.84	.11**	-.27**
Importance of job security	3.86	.98	4.17	.95	4.58	.77	.13**	-.29**
Community ties—								
own	6.53	5.37	7.28	7.42	7.69	6.59	.09**	-.07**
spouse's	4.53	4.39	4.58	4.67	4.98	5.43	.00	-.06*
children's	2.39	2.72	2.46	2.81	.73	1.74	.16**	-.06*
Career path factors								
Time in first position	2.14	1.51	3.08	3.04	4.18	4.30	.71**	-.11**
Predecessor's stay time	5.92	4.21	10.24	7.13	14.08	8.43	.10**	-.02
Available career options	6.56	9.69	6.34	10.81	5.14	11.87	-.12**	.05
Level of exposure/ visibility	12.25	13.65	11.95	14.91	9.55	12.35	-.08**	-.13**
Motives for moving								
Fear of stagnation	19.36	4.02	18.11	3.79	18.06	4.13	-.04	.13**
Career impatience	15.96	2.96	14.85	2.87	14.03	3.27	-.15**	.16**
Satisfaction with—								
achievement	11.60	2.02	11.70	2.15	11.78	2.34	-.07*	-.10**
recognition	9.55	2.72	9.68	2.79	9.82	2.97	-.03	-.16**
advancement	9.79	2.60	9.14	2.90	8.98	3.14	-.18**	-.17**
responsibility	11.05	2.29	11.24	2.30	11.72	2.09	-.02	-.12**
work itself	11.40	2.01	11.76	2.19	11.97	2.33	.01	-.10**
salary	6.94	2.76	7.42	2.92	8.49	3.24	-.09**	-.25**
co-workers	11.78	1.70	12.25	1.54	12.57	1.45	.03	-.13**
supervisor (human)	11.17	2.22	11.48	2.30	11.88	2.34	.00	-.11**
supervisor (technical)	10.80	2.91	11.11	2.67	11.33	2.69	.01	-.11**
company practices	8.10	3.09	8.98	3.02	9.73	2.88	-.08**	-.19**
Career mobility								
Average time per position	3.13	1.74	4.90	3.28	7.96	5.33	—	-.14**
Propensity to move	3.70	1.05	3.15	1.25	2.57	1.42	—	—
Demographic factors								
Salary grade	3.81	1.51	5.11	1.90	5.53	2.07	-.05	-.07*
Age	33.62	2.55	46.59	4.97	59.30	2.46	.41**	-.16**

*$p<.05$
**$p<.01$

to move were compared using the Scheffé (1969) a posteriori contrast test. This test was chosen because it does not require equal sample sizes and because it was the most appropriate for examining all combinations of group means and not just pairwise combinations (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). Given the generally conservative nature of this test, an α level of .10 generally is recommended (Edwards, 1968). At $\alpha = .10$, no significant differences were found among functional area groupings on either of the criterion variables. Salary grade and age are shown in Table 1 along with descriptive characteristics of the other study variables. From Table 1 it can be seen that managers in the learning stage receive the lowest pay; however, this variable accounted for little variance in average time per position or propensity to move. Although mobility and salary are related for executives (Jennings, 1967; Johnston, 1977), there appears to be no connection between rate of movement and salary. The relationship between age and the criterion variables reflects, in a more general way, the major construct being investigated in this study, work/career stages. Hence it would be redundant to include it as an independent variable.

One additional issue concerns the internal consistency of average time per position as a measure of rate of movement. Examination of career histories revealed fairly uniform managerial careers. Although some managers had moved from company to company quite frequently, the vast majority (90 percent) had made most of their moves within the same company. The one major difference between mobile managers (below average time per position) and immobile ones (above average time per position) was that mobiles made 41 percent more geographic transfers. (The correlation between average time per position and number of geographic transfers was $r = .29, p \leq .01$.) In addition, mobiles moved 48 percent more often laterally and 5 percent more often upward than did immobiles. Thus, in order to understand average time per position, it should be noted that managers who moved the most frequently achieved their higher rate of mobility through frequent lateral relocations.

Multiple regression was the primary statistical procedure used. Regression solutions were obtained by the stepwise multiple regression algorithm described by Nie et al. (1975). By using this approach, it was possible to examine the simultaneous influence of several individual/career related factors as a set, thereby overcoming the constraint that bivariate approaches impose on the issues at hand.

Results

In order to address the first research question, the two criterion variables, average time per position and propensity to move, were regressed separately on the common set of independent variables without regard for work/career stages. The results of this initial analysis are presented in Table 2.

From Table 2, it can be seen that the proportion of explained variance in average time per position ($R^2 = .56$) was greater, using the common set

Table 2
Regression of Average Time per Position and Propensity to Move on Career Factors ($N = 1,216$)

Independent Variable	Average Time per Position		Propensity to Move	
	Beta	Partial F-Ratio	Beta	Partial F-Ratio
Barriers to moving				
Marketability	-.080	13.76**	.121	17.81**
Value of company benefits	.001	.00	-.113	14.74**
Importance of job security	.042	4.59*	-.143	23.46**
Community ties—own	.065	5.99*	-.029	.70
—spouse's	-.005	.04	-.053	2.22
—children's	.100	22.30**	-.054	3.57
Career path factors				
Time in first position	.652	1054.96**	-.064	5.75*
Predecessor's stay time	.044	5.01*	-.039	1.69
Available career options	-.045	5.26*	-.002	.00
Level of exposure/visibility	-.053	6.15*	-.096	11.55**
Motives for moving				
Fear of stagnation	-.034	2.48	.058	3.95*
Career impatience	-.077	12.30**	.097	11.02**
Satisfaction with—				
achievement	-.006	.06	.021	.32
recognition	.038	2.26	-.046	3.88*
advancement	-.128	26.91**	-.069	4.35*
responsibility	.011	.22	-.024	.57
work itself	.039	2.35	-.026	.60
salary	.038	2.98	-.100	11.59**
co-workers	.017	.60	-.038	1.65
supervisor (human)	-.025	.97	.015	.20
supervisor (technical)	.024	1.02	-.016	.27
company practices	-.046	4.49*	-.030	1.05
	$R = .75$; $df = 22,1193$; $F = 70.99$; $p < .001$		$R = .45$; $df = 22,1193$; $F = 14.62$; $p < .001$	

*$p < .05$
**$p < .01$

of predictors, than the proportion of explained variance in propensity to move ($R^2 = .21$). This could be due, in part, to the choice of independent variables and their respective influence on each criterion variable. However, it appears that a major reason for this difference is the significant contribution made by time in first position to explaining variance in average time per position. To test this further, a separate regression was done on each criterion variable, with time in first position excluded from the set of predictor variables. The proportion of explained variance in average time per position dropped significantly to $R^2 = .35$, but it remained almost the same for propensity to move ($R^2 = .20$). This further analysis suggests that time in first position plays a major predictive role in subsequent rate of movement.

The partial F-ratios reported represent the amount of variance contributed by each predictor variable after all others are included in the model. Besides time in first position, all of the other career path factors, including predecessor's stay time, available career options, and level of exposure/visibility,

made significant contributions to explained variance in average time per position. In addition, such career barriers as marketability, importance of job security, and community ties (own and children's)—as well as such motives for moving as career impatience, satisfaction with advancement, and satisfaction with company practices—contributed significantly to explained variance in average time per position. As for propensity to move, the career barriers of marketability and importance of job security repeated as significant predictors, but community ties (own and children's) did not. In addition, the value of company benefits entered the equation as significant for propensity to move. Of the four career path factors, two retained their significance in explaining variance in propensity to move, time in first position, and the level of exposure/visibility. Two motives for moving, career impatience and satisfaction with advancement, also were significant influences on propensity to move. In addition, fear of stagnation and satisfaction with salary significantly contributed to explained variance in propensity to move. In sum, 11 of the 22 predictor variables contributed significantly to explained variance in average time per position, and 9 of the 22 to explained variance in propensity to move. Of these, six repeated and eight were unique to one or the other criterion variables.

To address the second research question, work/career stage data were added in the form of dummy variables to the set of predictor variables, in effect increasing the number of independent variables. Two separate regression solutions then were generated, one for average time per position and one for propensity to move. For average time per position, the addition of the dummy variables resulted in an increase of 3 percent in explained variation ($R^2 = .59$). An F test of this improvement was significant at the .001 level ($F = 48.21$, $df = 2,1191$). The same procedure, when used for propensity to move, resulted in an R^2 increase of 1 percent ($R^2 = .22$), which was significant at the .01 level ($F = 6.51$, $df = 2,1191$). These increases in R^2 appear to be linked with increases in average time per position and decreases in propensity to move associated with career stages (see Table 1).

Work/Career Stage Differences

The next major research issue dealt with the degree to which differences existed *among* work/career stages with regard to the interrelationships among the individual/career related factors used as predictor variables. Given that the above findings suggested that addition of stages enhanced the prediction, it was necessary to generate three separate regression equations, by stage, for each criterion variable so that a basis for comparison with the common solution (described above using the aggregated data and stages as dummy variables) could be made. The results are shown in Tables 3 and 4. In order to test for differences among the related sets of three, by stage, equations with the common solution equations, a test developed by Neter and Wasserman (1974), was used. Essentially, this procedure generates an F statistic based on a comparison of the residual sums of squares

Table 3
Regression of Average Time per Position on Career Factors by Career Stages

	Work/Career Stages					
	Learning (age 29-37) (N=194)		*Maturity (age 38-55) (N=785)*		*Preretirement (age 56-64) (N=237)*	
Independent Variable	*Beta*	*Partial F-Ratio*	*Beta*	*Partial F-Ratio*	*Beta*	*Partial F-Ratio*
Barriers to moving						
Marketability	-.103	3.97*	-.030	1.29	-.034	.49
Value of company benefits	.038	.40	-.002	.00	.103	4.65*
Importance of job security	.090	1.91	.032	1.30	-.004	.01
Community ties—own	-.129	2.69	.073	4.56*	.101	2.55
—spouse's	-.078	1.11	-.029	.70	-.026	.16
—children's	.018	.07	.082	8.81**	-.078	2.63
Career path factors						
Time in first position	.606	110.50**	.676	705.88**	.659	198.16**
Predecessor's stay time	.162	4.04*	.033	1.39	.029	.19
Available career options	.043	.56	-.027	1.15	-.100	4.43*
Level of exposure/visibility	-.091	1.99	-.015	.32	-.114	5.42*
Motives for moving						
Fear of stagnation	-.037	.34	-.020	.54	-.122	5.61*
Career impatience	-.055	.67	-.064	5.48*	-.087	2.64
Satisfaction with—						
achievement	.039	.27	.042	1.45	-.046	.43
recognition	.095	1.47	.060	3.48	-.008	.02
advancement	-.229	12.06**	-.144	20.26**	-.037	.36
responsibility	-.096	1.73	-.032	1.13	.055	1.00
work itself	.097	1.94	.018	.30	.013	.05
salary	.048	.61	.001	.00	.066	1.54
co-workers	.054	.67	.012	.14	-.057	1.24
supervisor (human)	-.032	.19	-.045	1.92	-.025	.17
supervisor (technical)	-.023	.11	.068	5.20*	-.022	.14
company practices	-.009	.02	.015	.28	.098	3.60
	$R=.71$; $R^2_s=.44$ $df=22,171$; $F=8.15$ $p<.001$		$R=.73$; $R^2_s=.52$ $df=22,762$; $F=43.01$ $p<.001$		$R=.76$; $R^2_s=.54$ $df=22,214$; $F=13.99$ $p<.001$	

*$p<.05$
**$p<.01$

between regression equations. Hence, in this case, the *total* residual sums of squares of the sets of three equations, by stage, were compared to the residual sums of squares obtained by their respective common solutions for each criterion variable.

The result for average time per position was an $F=1.90$ ($df=44,1147$) which was significant at the .01 level. For propensity to move, however, the test yielded an $F=1.19$ ($df=44,1147$), which was not significant. In the case of propensity to move, the results indicated that the slopes of the separate (by stage) regression lines were essentially equal. This means that besides the differences in levels of propensity to move by stage (reflected in the intercept term of the regression solutions), the common regression solution for propensity to move was generalizable across all stages. In contrast, this analysis suggests an interaction between stages and the predictor variables with respect to average time per position. In effect, not only were

Table 4
Regression of Propensity to Move on Career Factors by Career Stages

	Work/Career Stages					
	Learning (age 29-37) (N=194)		*Maturity (age 38-55) (N=785)*		*Preretirement (age 56-64) (N=237)*	
Independent Variable	*Beta*	*Partial F-Ratio*	*Beta*	*Partial F-Ratio*	*Beta*	*Partial F-Ratio*
Barriers to moving						
Marketability	.047	.38	.053	2.22	.153	5.33*
Value of company benefits	-.114	2.22	-.097	6.96**	-.070	1.13
Importance of job security	-.068	.69	-.171	21.56**	-.111	2.45
Community ties—own	-.164	2.80	.005	.01	-.067	.60
—spouse's	-.022	.06	-.068	2.23	.006	.00
—children's	-.118	2.05	.035	.95	-.027	.18
Career path factors						
Time in first position	.008	.01	-.028	.69	-.111	2.98
Predecessor's stay time	-.040	.36	-.038	.97	-.057	.49
Available career options	-.118	2.77	.039	1.35	-.023	.12
Level of exposure/visibility	-.153	3.93*	-.091	6.48*	-.064	.92
Motives for moving						
Fear of stagnation	-.020	.06	.018	.25	.207	10.58**
Career impatience	.159	3.94**	.095	6.98**	.000	.00
Satisfaction with—						
achievement	-.074	.61	.037	.65	.068	.53
recognition	-.025	.06	.001	.00	-.215	6.91**
advancement	-.125	2.29	-.087	4.53*	-.043	.25
responsibility	-.035	.15	-.047	1.40	-.045	.36
work itself	-.182	4.32*	-.030	.47	-.158	3.44
salary	-.038	.25	-.143	15.13**	-.014	.04
co-workers	-.260	9.99**	-.005	.02	-.006	.01
supervisor (human)	.155	2.74	.006	.02	.032	.18
supervisor (technical)	.036	.17	-.038	.95	.002	.00
company practices	.060	.59	-.052	1.99	.050	.48
	$R=.46$; $R_s^2=.15$ $df=22,171$; $F=2.22$ $p<.01$		$R=.44$; $R_s^2=.20$ $df=22,762$; $F=8.84$ $p<.001$		$R=.48$; $R_s^2=.18$ $df=22,214$; $F=2.71$ $p<.01$	

*$p<.05$
**$p<.01$

there differences among stages on average time per position, but also the patterns of influence between the career-related predictor variables and average time per position were significantly different.

In Tables 3 and 4, the coefficients of determination (R^2) are corrected for shrinkage (R_s^2) because the ratios of predictor variables to number of observations were decreased in the analyses using separate work/career stages. This treatment provides a more conservative measure of explained variation than does the uncorrected R^2. The variation explained in average time per position by the predictor variables was highly significant for all stages, ranging from 44 percent for the learning stage to 54 percent for the preretirement stage. In like manner, levels of explained variation in propensity to move were significant across all stages, ranging from 15 percent for the learning stage to 20 percent for the maturity stage. Time in first position was a particularly salient determinant of average time per position for all stages, because the average time in first position increased in

each stage in direct relationship to average time per position. In addition, eight of the predictor variables were mutually exclusive to one of the stages when predicting average time per position, and eight were mutually exclusive in predicting propensity to move. Out of 22 predictor variables, only 4 contributed to explained variance of both criterion variables, and of these only 1, career impatience, was influential during the same stage.

Discussion

In this study, an attempt was made to examine within a multivariate framework the impact of several individual/career related factors on career mobility. The factors have been suggested in the literature as influential in the shaping of managerial careers. Further, the study sought to examine whether or not work/career stages affected these relationships. As a consequence, several important findings emerged. However, there are several reasons why these results should be conservatively interpreted. First, differences in sample size among work/career stage groupings and the presence of intercorrelations among predictor variables tend to confound any substantive interpretation. Second, the interrelationships among the predictor variables and their linkages to career mobility are not completely understood. Because of such limitations, any notion of causality implied between the predictor variables and career mobility must remain tentative until future multivariate research has been aimed at this question.

Initially, it was found that average time per position was significantly related to several factors including: such career barriers as marketability, importance of job security and community ties (own and children's); the career path factors of time in first position, predecessor's stay time, available career options, and level of exposure/visibility; and such motives for moving as career impatience, satisfaction with advancement, and satisfaction with company practices. When work/career stages were accounted for in the overall regression for average time per position, a significant amount of additional variance was explained, reflecting, in part, the wide differences found in average time per position among stage groupings. In part, these differences support Schein's (1971) model of managerial mobility patterns. In his model, mobility, in essentially cone-shaped organizations, consists of several lateral moves as one achieves centrality but then becomes increasingly constrained by hierarchy that cannot accommodate the flow of all managerial talent. However, further analyses using three separate (by work/career stage) regression equations demonstrated a significant improvement in predicting average time per position over that provided by an aggregate common solution. What this finding suggests is that variation in rate of movement is not merely an artifact of corporate structure reflected in career stages (Schein, 1971; Veiga, 1971, 1973) but is also a function of individual/career related factors unique to a particular work/career stage.

Pursuing this analysis by work/career stage revealed that several of the predictor variables linked with average time per position were somewhat

more salient during specific stages. During the learning stage, marketability, time in first position, predecessor's stay time, and satisfaction with advancement appeared most influential. These findings suggest, albeit tentatively, that a manager's confidence in his or her potential marketability has its greatest impact on career mobility in the early developmental years of being a manager and is not, as some have suggested (Hall, 1976), a major deterrent to mobility in later career stages. Second, during these crucial years of establishing a track record, managers who generally tend to remain in jobs for more prolonged periods—as evidenced by time in first position, or as Jennings (1967, 1971) has suggested, who find themselves following in the footsteps of an immobile superior—tend to experience less frequent movement. And, lastly, the younger fast track managers are not, as some have described (Jennings, 1967; Packard, 1962), corporate malcontents continually dissatisfied with their advancement potential. On the contrary, their less peripatetic counterparts appear to be the most dissatisfied with advancement, perhaps because they are less able or willing to pursue, actively, other career options.

During the maturity stage, community ties (own and children's), time in first position, career impatience, satisfaction with advancement, and satisfaction with supervisor's technical skills appeared most influential. These findings suggest that during this period of increased lateral movement, two major obstacles to mobility are the manager's own ties to a community and those of his or her children. During this stage, the mature, seasoned talent enters the corporate mainstream and most often is faced with relocation decisions (Veiga, 1981a). Hence the issue of uprooting self and family becomes particularly salient. Surprisingly, although some have suggested the growing impact of dual career couples on career mobility (Hall & Hall, 1978), spouse's community ties were not influential during this stage. Although the dual career couple is an emerging phenomenon in management today, less than 20 percent of the managers in the maturity stage indicated that their spouse's work was an obstacle in their relocation decisions—suggesting that dual careers are not yet pervasive in middle management.

Unlike the learning stage, during the maturity stage career path factors appeared less influential except for the continued impact of time in first position. It appears that managers are not necessarily constrained by their predecessor's actions and, contrary to Jennings's (1967) contention, exposure and visibility do not seem to be a major influence on mobility at this time. Nevertheless, during this stage mobility is predicated on, to some degree, career impatience. As Davis and Gould (1981) have suggested, this frequent movement may be one of the ways in which the more anxious managers cope with the mid-life, mid-career transition. Unfortunately, such movement often is predicated on seeking continued satisfaction from "advancement," which often is no more than carousel-like in direction. It also appears the mobile managers during this stage are more disenchanted with their bosses' technical skills. Perhaps, as the mobiles become more impatient with career progress, they perceive their bosses' lack of complete

competence as a good reason to move on rather than face the risk of having their own careers blunted.

During the preretirement stage, value of company benefits, time in first position, available career options, level of exposure/visibility, and fear of stagnation appeared most influential. The findings suggest that during this later stage of career when mobility begins to decline sharply, those who have been the least mobile place the highest value on company benefits. Although company benefits would seem to be a major barrier to leaving during the maturity stage, given the low incidence of interorganizational movement found, it appears that company benefits become more of a rationalization for staying put for those who have been the least mobile within the organization. It also is during this last stage of slowed movement when career path factors appear, once again, as more salient. Hence, the career pattern of those who began their careers by moving slowly appears to continue throughout their careers. Those who have been the most mobile perceive the greatest number of career options still available and also experience the greatest amount of exposure and visibility to top management—in all likelihood the consequence of more frequent lateral movement throughout career and not the cause. Even though Saleh (1964) has argued that managers in the preretirement stage turn their attention away from fulfilling greater career expectations and seeking career challenges, the mobiles appeared to be motivated by a greater fear of stagnation than did their counterparts. Although Levinson (1978) suggests that most managers begin to reconcile the plateauing of their careers during the mid-forties as part of a "de-illusionment" process, it appears that the mobiles are still unwilling to accept career plateauing during the preretirement stage. Perhaps, as Veiga (1981b) has suggested, they are less willing to equate continued lateral movement with plateauing and continue to seek out such movement until retirement.

With respect to treating propensity to move as the dependent variable, the analyses revealed considerable differences in predictor variables. Propensity to move was initially related to several factors including: the career barriers of marketability, value of company benefits and importance of job security; the career path factors of time in first position and level of exposure/visibility; and the career motives of fear of stagnation, career impatience, and satisfaction with recognition, advancement, and salary. When work/career stage information was added to the overall regression for propensity to move, a significant amount of added variance was explained, reflecting, in part, the relatively wide differences in levels of propensity to move found among stages. However, analysis using three separate (by stage) regression equations indicated that the common solution and by-stage solutions were essentially equal in explaining variance in propensity to move. This finding furthers the work of Grusky (1966) by suggesting that propensity to move is primarily a function of length of organizational tenure. In addition, although certain predictor variables were more salient during specific work/career stages for propensity to move, the findings suggest

that these relationships cannot be attributed to differences in work/career stage and, at best, represent results that are confounded by the close relationship between length of tenure and work/career stage.

Overall, the findings indicate that, as a set, the predictor variables included in this study are capable of explaining a significant portion of variance in average time per position and to a somewhat lesser extent propensity to move, providing partial support for Van Maanen's (1977) career paradigm, which includes internal factors as influential elements in the final career outcomes (shape). Moreover, although it appears that rate of movement and propensity to move were somewhat interrelated, their lack of shared antecedents leaves some question as to their relationship. To some extent, what confounds these two dimensions of career mobility is that, even though the contemporary literature—see especially Jennings (1967, 1970, 1971)—suggests that mobile managers move more frequently because of their propensity to move, propensity to move measures one's willingness to move *inter*organizationally, but frequency of movement, expressed in average time per position, to a large extent measures *intra*organizational movement. Hence, although managers appear to express varying degrees of propensity to move, their actual movement patterns suggest a greater opting for movement within the same organization—in some instances, movement that probably was precipitated by their greater willingness to move if the opportunity were available. Until a longitudinal study is done, it is impossible to determine the degree to which propensity to move may antecede or result from actual movement.

Lastly, the pervasive impact of time in first position on subsequent frequency of movement during all work/career stages deserves closer scrutiny. Although Berlew and Hall (1966) and others have built a strong case for the impact of a company's initial expectations on a manager's subsequent performance and success, their research focused primarily on the first five years of an individual's career and relied heavily on subjective measures of performance. The present study suggests that time in the first position is a fairly powerful predictor of a manager's rate of career movement, not only in the early stage of a career but also throughout all stages. In part, this finding can be explained by Hall's contention that "American business may go through cycles with varying rates of advancement during different time periods" (1976, p. 130). The data support this contention, indicating that those in the preretirement stage cohort began their careers in an era of slower advancement, and those in the maturity stage cohort and especially those in the learning stage cohort began during more rapid periods of advancement. However, the findings also indicate little relationship between salary level and a specific cohort's actual rate of movement, so that any suggested relationship between career mobility and career success for middle managers must remain suspect. Apparently, although many managers are mobile, only a few achieve significantly larger salaries if, and only if, they are able to move eventually to an executive level position.

In sum, this study represents a first step toward developing an empirical basis for identifying some of the determinants of career mobility. Future research could prove valuable in at least two areas. First, longitudinal studies of managerial careers, as the mobility events occur, are essential if present knowledge is ever to be extended beyond the inferential and conceptual stage. However, given the lack of empirical research in this area, it would seem that longitudinal studies may be somewhat premature until additional exploratory work aimed at building more tenable models has been done. Second, additional research should focus on the contextual dimensions of a managerial career path, especially with respect to how such factors constrain the shape of a career. For example, how is it possible that the timing of mobility events throughout a managerial career is so largely influenced by time spent in first position? Is it possible that this, too, is an outcome of effective or ineffective organizational socialization in the early career period? Or is this a strong indicator of individual differences? Also, if individual factors such as predecessor's stay time have influence on early career movement potential, then to what extent can managers actively influence this factor and their subsequent mobility potential?

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Career Lines and Employment Stability

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This research examined the influence of organizational career line variables, such as career line length, career line ceiling, position ratio, position mobility opportunity, on such variables as turnover and intent to remain with the organization. A position's mobility opportunity and the increase in salary associated with promotion were found to combine multiplicatively to influence the membership decision.

There has been increasing interest among organizational scholars in the concept of the career. The career provides a framework for viewing individual participation in the work force on a longitudinal basis and recognizes that a single position may be viewed as only a step in a given career by the individual. Models of behavior that use characteristics of the position that an individual is occupying as predictors of attitudes and behaviors may miss the essential features of the total expected career that are actually affecting these attitudes and behaviors. In general, the concept of career provides a framework for viewing the individual's experienced past and anticipated future, adding the dimension of time to the analysis (Van Maanen & Schein, 1977). The career also gives individuals a basis for evaluating their progress, whether they reference success by comparison of their current position to the top of a career line or to the entry point of the career line (Tausky & Dubin, 1965).

Careers have been studied from both the "subjective career" perspective and the "objective career" perspective (Hughes, 1958), The subjective career deals with the series of work related experiences and attitudes that span an individual's working life (Hall, 1976; Van Maanen & Schein, 1977). Topics such as occupational choice (Super & Bohn, 1970), career development (Hall & Hall, 1976), and career stages (Hall & Nougaim, 1968; Miller & Form, 1964) all characterize the subjective career perspective. From the objective career perspective, the career is viewed as a structural feature of an organization, that is, it is viewed as a regularized graded sequence of positions (Dubin, 1958; Martin & Strauss, 1956; Milkovich, Anderson & Greenhalgh, 1976; Slocum, 1974; Wilensky, 1960).

The present study is concerned with the impact of organizational careers, viewed as a structural feature of the organization, on employee stability and commitment. In a sense, this will blend aspects of the objective career approach with aspects of the subjective career approach in that it focuses both on objective characteristics of career patterns and on individuals' reactions to their careers.

There have been two major approaches to studying the employee membership decision. The first has concentrated on the identification of various factors associated with turnover. Those taking this approach have concerned themselves mainly with correlating various facets of job satisfaction with turnover. Building on two earlier extensive reviews of the turnover literature (Price, 1977; Steers & Porter, 1973), Mobley, Griffeth, Hand, and Meglino (1979) found numerous studies investigating the relationship between turnover and variables such as: personal factors (e.g., age, tenure), overall job satisfaction, satisfaction with pay and promotion, satisfaction with supervision, group factors (e.g., cohesiveness), organizational factors (e.g., climate control system), satisfaction with work content, external opportunity, and organizational commitment. They concluded their review by developing a multivariate model of turnover that suggests that turnover is related to three major factors: satisfaction with the present job, attraction-expected utility of the present job, and attraction-expected utility of alternative opportunities.

Although the concept of the organizational career can be nicely integrated into this model, and it is implicitly dealt with vis-à-vis expected utility of the present job, little explicit attention is paid to the role of the organizational career in the turnover process. The seven studies cited by Mobley et al. (1979), in addition to two other studies found dealing with the relationship of turnover and upward mobility (Hrebiniak & Alutto, 1972; Martin, 1979), deal with either satisfaction with promotion or perception of mobility opportunity. A search of the career literature uncovered a number of variables that can be used to classify organizational career lines. The literature identifies these career-based variables, but no study located to date has concerned itself with determining the relationship between these objective career-based variables—such as position ratio, mobility opportunity, career line ceiling, and career line transit time—and organizational membership. These career variables are defined as follows:

A. Height of the career line ceiling—The height in the organizational hierarchy of the highest position in a career line (Milkovich et al., 1976).
B. Length of the career line—The number of positions from entry point to ceiling in an organizational career line (Milkovich et al., 1976; Wilensky, 1960).
C. Position ratio—A position characteristic measuring the ratio of the number of incumbents in the next higher position in a career line to the number of incumbents in the focal position (Caplow, 1954; Wilensky, 1960).

D. Upward mobility opportunity—A ratio of the number of openings in a given period of time in the next higher position in a career line to the number of incumbents in the focal position (Milkovich et al., 1976; Slocum, 1974; Vroom & MacCrimmon, 1968).
E. Transit time—the time it takes to move from one position to the next within a career line (Roth, 1963).

The limited treatment of these variables in the empirical literature forces a deductive approach to the generation of research hypotheses. By turning to more general models of turnover and organizational attachment, hypotheses predicting the relationships between these career-based variables and the organizational membership decision can be derived. This general approach to examining turnover has focused on the individual decision making process vis-à-vis process motivational models. In examining turnover from this perspective, theorists most notably have turned to either equity theory (Telly, French, & Scott, 1971) or expectancy theory (Mitchell & Albright, 1972; Mitchell & Knudsen, 1973; Vroom, 1966). Briefly, a combined expectancy/equity model posits that individuals engage in specific behaviors when they perceive equitable rewards to be the result of these behaviors. Fundamentally, this expectancy/equity notion can account for choice among alternative opportunities, but how well does it do in explaining consistency or stability of organizational membership?

The findings of a number of investigations have indirectly questioned the utility of the expectancy/equity model as a complete model of the employee membership decision (Chinoy, 1952; Hearn & Stoll, 1975; Staw, 1974; Vroom & Deci, 1971). In general, they all found instances of continued membership despite unmet expectations and changing values and personal goals (i.e., reward valences). Building on Becker's (1960) notion of commitment, Scholl (1981) suggests that the concept of commitment can be viewed as an alternative motivational force that acts to stabilize behavior when the expectancy/equity conditions are not met. His review of the literature indicates that four potential commitment mechanisms exist: (1) investments, (2) reciprocity, (3) lack of alternatives, and (4) identification. The present study investigating the impact of organizational career line variables on membership will proceed by generating hypotheses linking these variables to employee membership using the expectancy and commitment constructs outlined above.

The Career Line and Membership

There are two major themes in the theoretical career literature that will help in linking career-based variables to membership through the motivational models. The first is that careers are likely to increase membership propensity through expectancy, that is, internal paths of mobility are a major mechanism that fosters high expectancies (Dubin, 1958; Perrow, 1972; Slocum, 1974; Wilensky, 1960). The argument presented by these writers is best expressed by Dubin (1958) when he states that the stable set of organized

incentives provided by the career is so important with respect to membership that employers must develop functional equivalents to careers in order to stabilize membership in positions that are not part of careers.

The other theme suggests that commitment is increased through careers because of increased investments required of careers (Becker & Strauss, 1956), the building of debt incurred in advancing and sponsorship (Martin & Strauss, 1956), the development of trained incapacity (Dubin, 1958), and the fostering of identification with the career (Dubin, 1958; Van Maanen & Schein, 1977).

Additionally, there is an interaction between expectancy and commitment best expressed by Wilensky in pointing out that, "by holding out the prospect of continuous predictable rewards, careers foster a willingness to train and achieve, to adopt a long view and defer immediate gratifications for the later payoff" (1960, p. 555).

Although empirical support of the interesting relationships suggested in the theoretical literature is sparse, the few studies dealing with these relationships generally have been supportive. In studying Israeli engineers, Kirschenbaum and Goldberg (1976) found two types of mobility orientations. The first group of engineers had cosmopolitan values; that is, they expressed a desire to secure external collegial rewards. The second group, termed career mobile locals, confined their career aspirations to within the work organization. When the strong local career aspirations were not met, the propensity to move among this group increased, suggesting that an individual's perceived mobility probability is a factor in the membership decision. Stevens, Beyer, and Trice (1978) found a negative relationship between a federal service manager's years in his or her position and the propensity to remain with the organization.

Other investigations also have supported the proposition that there is a positive relationship between career variables and propensity to remain. Hrebiniak and Alutto (1972) found a positive relationship between satisfaction with advancement and propensity to remain, and Martin (1979) uncovered a negative relationship between perceptions of upward mobility and the propensity to leave among employees of a service-oriented business organization.

As can be seen, there has been little empirical testing of the relationship between specific career line variables and membership. Mobility probability is the career variable most extensively studied. Additionally, only overall perceptions of mobility were used in the investigations that were undertaken. In no case were the various career line variables studied separately to determine which particular features of a career line are important in the membership decision. Another problem with the past research is that individual perceptions of mobility were used and measured at the same time the individual indicated his or her intent to remain, suggesting that some contamination of measures might have existed. Given these weaknesses, the following hypotheses are suggested, which (1) use hard measures to identify organizational career lines and calculate specific career line dimensions

and (2) examine the specific characteristics of the organizational career line separately.

The positive relationship between perceptions of upward mobility and attachment clearly suggests that the variables of position ratio and mobility opportunity are negatively associated with turnover and positively associated with intent to remain with the organization. A clear indication of a positive relationship between transit time and turnover and a negative relationship between transit time and intent to remain can be drawn from the Stevens et al. (1978) findings. Using the expectancy construct, it is predicted that career line length and career line ceiling height are negatively associated with turnover and positively associated with intent to remain, as both tend to increase the valence of mobility. Thus, from the limited empirical research and deductions from the expectancy construct, the following three hypotheses are generated:

Hypothesis 1: The turnover rate of a position will be negatively associated with the height of the ceiling of that position's career line, the position ratio of that position, and the mobility opportunity of that position, and positively associated with the transit time of that position.

Hypothesis 2: The mean intent to remain for individuals in entry level positions will be positively associated with the number of positions in the career line of that entry level position.

Hypothesis 3: The mean intent to remain of individuals in each position will be positively associated with the height of the ceiling of that position's career line, the position ratio of that position, and the mobility opportunity of that position, and negatively associated with the transit time of that position.

The commitment theme also finds limited support in the empirical literature. In one of the few studies that concentrated on the relationship between the career and commitment, Grusky (1966) found that the propensity to remain increased as individual mobility perceptions increased. Furthermore, the greater the obstacles the individual had to overcome to achieve past mobility, the greater the commitment to the organization. Both investments and reciprocity notions could explain this phenomenon. Stevens et al. (1978) also found that total years with the organization, rather than in a position, was positively associated with propensity to remain with the organization. These findings, combined with the commitment construct (specifically the investment concept), lead to the generation of a fourth hypothesis:

Hypothesis 4: The intent to remain of individuals within the organization will be positively associated with the number of positions in the career line that the individual has held.

Method

To test the above hypotheses, a cross-sectional research design was developed whereby covariance between the organizational career line variables

(independent variables) and turnover and intent to remain (dependent variables) was examined.

Two large southern California based savings and loan associations were selected for study, henceforth referred to as organization A and organization B. Questionnaires were distributed to the entire population from regional branch manager down in both organizations. The return rate for organization A was 73.1 percent, and the return rate for organization B was 71.3 percent. Organization A consisted of 17 distinct positions, with a research population of 386. There were 15 positions in organization B, with a research population of 566.

Research Instruments

The research instrument used in this study consisted of two parts: career history form and intent to remain scale. Data obtained from the career history form were used to identify career lines, calculate the career line variables, and calculate the turnover rate for each position. The intent to remain scale was scored, and these scores were used as a measure of one of the dependent variables.

Career History Form. The first part of the instrument distributed to each employee presented the employee with a checklist containing each position in the organization. Respondents were instructed to place an X beside those positions they had held previously in the current organization, and to indicate the dates they had held these positions. In addition, they were required to place an O beside those positions they expected to hold in the future with the organization.

Intent to Remain Scale. Intent to remain with the organization reflects the individual's current plans with respect to his or her future with the organization. Intent to remain can range from short term (the individual has definite plans for leaving the organization) through indefinite (the individual continues membership as long as he or she continues to remain satisfied) to long term (the individual plans to remain with the organization for a long period of time and contemplates no future moves). The purpose of the intent to remain scale is to obtain a measure of each employee's current intention with respect to remaining with the organization. A Thurstone scale format was chosen to accomplish this purpose. Items were selected representing different degrees of intent to remain, ranging from short term to long term. Those 20 items were presented to a group of 75 graduate students in administration who acted as judges. The judges were asked to rate each item as to the degree that they felt the item represented a long or short term intent to remain on a 7-point scale.

From the data obtained from the judges, the mean and standard deviation were calculated for each item. Items with a standard deviation greater than 1 were eliminated from consideration (Edwards, 1957). From the remaining items, six were selected with means closely representing equal intervals.

Respondents were instructed to select the item best expressing their current intentions. The intent to remain score assigned to an individual was the score assigned to the item that he or she selected.

Measures

The measurement of intent to remain was simply taken from the respondent's scores on the intent to remain scale. For those hypotheses tested using the position as the unit of analysis, the intent to remain score for each position was obtained by calculating the mean score for respondents currently occupying each position. Those tests using the individual as the unit of analysis simply used the individual's raw score on the scale. Calculation of the turnover rate and the organizational career line variables was more complex. Data obtained from the career history form were used. The measures calculated were objective measures of career line variables and attitudinal responses to the organization. In no case were two sets of perceptions from a given sample of employees compared. In most cases, objective career line measures were analyzed with respect to employee attitudes and self-reports of behaviors.

Identification of Organizational Career Lines. Because the major focus of this research was to investigate the impact of certain properties of organization career lines on stability and performance, the identification of various career lines becomes an important task. Conceptually, positions are lined together in a career if incumbency in one position is a prerequisite for advancement to the next position. To operationalize this concept, one must track individual movement through the organization to identify these regularized paths of mobility. To identify empirically the various organizational career lines within each organization, data from the career history form were used. The first step was to separate responses by position. For each position within the organization, the percentage of respondents entering that focal position from each other position within the organization as well as from directly outside the organization was calculated. Identification was made of the positions from which 50 percent or more of the current respondents came. These positions were then linked with the focal position in an organizational career. This process was followed until all mobility clusters were identified. Once a position was found at which most of the respondents (more than 50 percent) entered from outside the organization, this career was identified as the career line port of entry.

Turnover Rate. The turnover rate of a position was defined as the percentage of incumbents who left the organization from that position over a one year time span. Because direct access to personnel records was not permitted, data obtained from the career history form were used to obtain an estimate of the turnover rate for each position, and the following procedure was employed. First, the total number of new (since January 1978) employees in each position was determined. Because no new job slots were created over this period these new employees either replaced an individual

who had left the organization or one who had been advanced. By subtracting the number of employees advanced from the number of new employees, the number of turnovers from that position could be obtained. The number of advanced employees was determined by counting the number of respondents in all other positions that were in the focal position in January 1978. Once the number of turnovers was determined, the turnover rate for the position was determined by dividing the number of turnovers by the number of respondents in that position.

Ceiling. The ceiling of a career line was defined as the salary of the highest position in that career line. This was established by examining the salary schedule secured from the personnel directors of the two organizations. A position was assigned a ceiling by matching it with the salary of the highest position in its career line.

Transit Time. The transit time for a position is defined as the amount of time an individual can expect to remain in a given position before advancing to the next position in the organizational career line. An estimate of the transit time for each position was made by identifying those individuals in the next highest position coming from the focal position and calculating the mean length of time in months they spent in the focal position before being promoted.

Position Ratio. The position ratio of a focal position was calculated by dividing the number of incumbents in the next higher position in the organizational career line by the number of incumbents in the focal position.

Mobility Opportunity. The mobility opportunity is a measure similar to the position ratio, but it accounts for potential blockages in the career line because of lack of vacancies in an upper position. The mobility opportunity is a ratio of the number of vacancies in the position above the focal position to the number of incumbents in the focal position. It was calculated by dividing the number of vacancies since January 1978 in the next position above the focal position by the number of incumbents in the focal position.

Results

In general, the results of this study support the contention that career-based variables are considered in the individual's membership decision. The findings reported in this study show that the existence of an organizational career line can be a mechanism for organizational attachment. Of the career-based variables tested in the hypotheses, a position's mobility opportunity had the strongest association with membership. Because of the exploratory nature of this investigation, another career-based variable, the expectancy-valence score, was calculated and the strength of its relationship with membership was tested. The expectancy-valence score is a variable derived from expectancy theory that combines mobility opportunity and incremental increase in salary associated with a career line move. The expectancy-valence score was found to be strongly associated with membership.

Four specific hypotheses were tested that dealt with the relationship between career line variables and the propensity to remain in organizations. Two indications of propensity to remain were used: position turnover rate and the mean intent to remain of individuals in a position. The position turnover rate and the mean intent to remain of the individuals in that position were highly correlated ($r = -.71$). It thus is not surprising that the results of the tests made using these two variables as dependent variables were similar. The benefit of using both measures is that the tests could be made with the individual as the unit of analysis when using the individual's intent to remain score. The position turnover rate limited tests to the position level of analysis.

Identification of Organizational Career Lines

Career lines were identified by mapping the movement of individuals within each organization. In both organizations, distinct career patterns emerged from this analysis. In organization A, five career lines were identified. Organization B was found to contain six distinct career lines. These career lines were found to be rather distinct with very little mobility between career lines. In organization A, only 7.2 percent of the respondents started in a career line different from the one that they now are in. This figure for organization B is 6.7 percent. The notion of escalators (Becker & Strauss, 1956), that one has difficulty moving from one career line to another once embarked, is descriptive of these two organizations. The low percentages of lateral moves indicated here adds consistency to the measure of commitment, as those with previous organizational experience are likely to have followed the upward career path rather than have moved laterally.

Although definite career paths emerge, these organizations were not found to function as, what Caplow (1954) terms, a "closed bureaucracy." A closed bureaucracy consists of a limited number of entry ports with all other positions recruiting from individuals in the entry positions. In both organizations, the career lines were open to some degree. Upper positions in the career line recruited from outside the organization as well as from the positions below them in the career line. In organization A, 76.5 percent of the respondents in upper level positions (those not entry positions to a specific career line) came from within the organization; 23.5 percent of the respondents originated outside the organization. Similarly, in organization B, 68.8 percent of the respondents came from positions within the organization, and 31.2 percent came from the outside. Thus in both organizations there is a strong tendency to recruit from within the organization, but there is a degree of openness in the career lines.

Organizational Career Lines and Membership

The findings reported in Table 1 indicate mixed support for Hypothesis 1. There is a tendency for positions with higher ceilings (in terms of salary),

Table 1
Correlations Between Position Turnover Rates and Organizational Career Line Variables ($N = 21$)

Organizational Career Line Variable	r	r^2
Ceiling	−.40*	.16
Transit time	−.03	
Position ratio	−.46*	.21
Mobility opportunity	−.44*	.19
Difference score	−.04	
Expectancy-valence score	−.62**	.38

*$p < .05$
**$p < .01$

higher position ratios, and higher mobility opportunity to experience lower levels of turnover. These relationships were significant, but an examination of the proportion of turnover variance explained (r^2) by these organizational career line variables reveals only moderate explanatory power. Because of the exploratory nature of this investigation, an additional analysis was conducted in an attempt to increase the explanatory power of organizational career line variables.

Although the position's mobility opportunity and its ceiling each independently explained a moderate proportion of the turnover variance, a secondary analysis was conducted to determine whether a combination of the ceiling and mobility opportunity measures would result in greater explanatory power. A combination of these particular variables is justified by the basic expectancy-valence motivational model, as expectancy theory predicts that both expectancy and valence must be high before effort (in this case, remaining with the organization) will be expended. An expectancy-valence (E-V) score was calculated by multiplying the position's mobility opportunity score by a difference score. The difference score was calculated by subtracting the salary of the position from the salary of the next position in the career line. To test for independence between mobility opportunity and the difference score, the correlation between the two variables was calculated. Independence was indicated by the results of this calculation ($r = .08$). The correlation between the expectancy-valence score and the position's turnover rate was then calculated. The results of this calculation ($r = -.62$) indicated that the E-V score increased the proportion of turnover variance explained from 19 percent to 38 percent—a substantial increase.

The relationship between the number of positions in a career line and the intent to remain of individuals in entry level positions (Hypothesis 2) was tested using analysis of variance. The mean intent of individuals to remain in career lines with various length organizational career lines was compared. This comparison yielded no significant differences, thus leading to a rejection of Hypothesis 2.

Table 2
Correlations Between Intent to Remain and Organizational Career Line Variables
($N = 21$)

Organizational Career Line Variable	r	r^2
Ceiling	.40*	.22
Transit time	-.01	
Position ratio	.42*	.18
Mobility opportunity	.51**	.26
Difference score	.23	
Expectancy-valence score	.59**	.35

*$p < .05$
**$p < .01$

Hypothesis 3 provides for a more specific analysis of the relationship between intent to remain and career opportunity. As indicated in Table 2, mixed support for Hypothesis 3 was obtained. Intent to remain was significantly associated with ceiling, position ratio, and mobility opportunity. As with turnover, there was no significant relationship between intent to remain and transit time.

After discovery of the increased explanatory power of the E-V score in explaining the variance in turnover, the same type of analysis was conducted using the intent to remain score as the dependent variable. The results ($r = .59$) confirmed the validity of the expectancy-valence concept when applied to career-based variables.

The initial analysis of the relationship between intent to remain and transit time leads to a rejection of the research hypothesis; there was no linear relationship between the transit time of a position and the mean level of intent to remain of employees in that position. A secondary analysis of the data was performed to determine if there was any relationship between intent to remain and transit, not specifically predicted by the research hypotheses. Because each individual was assigned an intent to remain score and a position tenure score, it could be determined if intent varied as the individual remained in a position longer than the transit time for that position. In order to conduct this analysis, each individual was placed into one of three categories: (1) those individuals with position tenure less than the transit time for their position, (2) those individuals with position tenure between the transit time for their position and 12 months beyond the transit time, and (3) those individuals with position tenure greater than 12 months beyond the transit time for their position.

Regression analysis was used to test the relationship between these groupings and intent to remain by coding the groupings as follows: 0—category 2; 1—category 1; 2—category 3. For both organizations, the relationships reported in Table 3 were found to be significant. Intent to remain decreased for those past the transit time—that is, the expected promotion time—but increased for those well beyond the transit time, thus indicating that

Table 3
Mean Intent to Remain Scores for Employees with Varying Position Tenures Relative to Transit Time for Their Position

Position Tenure	Organization A N	Mean	S.D.	Organization B N	Mean	S.D.
Between entry and transit time	166	4.03	1.32	258	3.71	1.32
Between transit time and 12 months past transit time	43	3.09	1.27	50	3.32	1.42
Beyond 12 months past transit time	25	4.76	1.23	44	4.47	1.48
		$r=.34$*			$r=.22$*	

*$p<.01$

individuals take the transit time into consideration when making the membership decision.

Based on the commitment proposition, it was predicted that individual intent to remain would be positively associated with the number of career line positions that an individual had previously held (Hypothesis 4). This prediction was tested by comparing the intent to remain scores of individuals with 0, 1, 2, and 3 previous organizational career line positions. The results indicated that there was no significant difference in intent to remain scores based on difference in previous career line experience. This surprising finding prompted secondary analyses. Two factors that conceptually should moderate the relationship between the number of positions held and intent to remain were examined. The first was the difficulty of a vertical move, and the second was the expectation of future rewards.

Conceptually, one would not expect all career moves to require an equal investment on the part of an individual. The degree of effort required to advance could be viewed as a measure of the relative size of investment. From the data collected, the position's mobility opportunity represents the best estimate of the amount of effort it takes to advance from a given position. It is logical to assume that those positions in which mobility opportunity is low require more effort to advance than do those with high mobility opportunities. If a career move does represent an investment, one would expect greater commitment from those making difficult moves (low mobility opportunity) than from those making easy moves (high mobility opportunity). A classification scheme was developed to group individuals in accordance with the difficulty of previous advancement. Intent to remain was then analyzed using this difficulty of move grouping as a moderating variable. Moderated regression analysis was utilized to test the moderating effect of difficulty of move on the relationship between origin and intent to remain. This technique tests the interaction effect of two independent variables on a dependent variable through a comparison of the R^2 derived from a regression equation containing the two independent variables to the R^2 derived from an equation containing the two independent variables plus an interaction term. As the results of these analyses reported in Table 4 indicate, there is a significant interaction effect between difficulty of move and origin. Those advancing through the career line into an easy move

Table 4
Mean Intent to Remain Scores for Employees Classified by Origin and Difficulty of Upward Move

Difficulty of Upward Move	*Origin*	*Organization A (N=132)*		*Organization B (N=154)*	
		Mean	*S.D.*	*Mean*	*S.D.*
Hard	Outside	4.68	1.16	4.08	1.45
Hard	Within	3.30	1.30	3.01	1.28
Easy	Outside	3.94	1.22	4.16	1.22
Easy	Within	4.22	1.11	4.79	1.53
		R^2	F	R^2	F
Difficulty + origin		.0675	4.67	.0347	2.72
Difficulty + origin + D×O		.1522	7.60**	.0733	3.94**
Difference		.0847	12.79**	.0386	6.24*

*$p<.05$
**$p<.01$

position did not differ in intent from those entering from the outside. It was found that the commitment hypothesis did in fact hold for those making difficult moves, but it did not hold for those making easy moves.

The second exploratory analysis related to Hypothesis 4 involved the moderating effect of expectancy on the relationship between commitment, measured by the number of positions held, and intent to remain. Conceptually, one would predict that even individuals with low commitment might have long term intent if they held the expectation of holding future positions with the organization. This high expectancy would tend to offset the effects of low commitment of those with no previous career experience. In order to test the commitment hypothesis adequately, the effect of expectancy on intent to remain must be held constant.

By using a measure based on the individual's report of positions that he or she expected to hold with the organization as a basis for a measure

Table 5
Mean Intent to Remain Scores for Employees Classified by Commitment and Expectancy

Commitment	*Expectancy*	*Organization A (N=281)*		*Organization B (N=402)*	
		Mean	*S.D.*	*Mean*	*S.D.*
Low	Low	3.35	1.37	3.37	1.48
High	Low	4.30	1.22	4.20	1.38
Low	High	4.18	1.27	4.05	1.19
High	High	4.40	1.23	4.22	1.32
		R^2	F	R^2	F
Commitment + expectancy		.1037	16.07**	.0606	12.88**
Commitment + expectancy + C×E		.1161	12.13**	.0723	10.34**
Difference		.0124	3.90*	.0117	5.01*

*$p<.05$
**$p<.01$

of expectancy, individuals could be placed into one of four cells: (1) low commitment/low expectancy, (2) high commitment/low expectancy, (3) low commitment/high expectancy, or (4) high commitment/high expectancy. Once again, moderated regression analysis was used to test the moderating effect of expectancy on the relationship between commitment and intent to remain. The results of the analyses reported in Table 5 support the contention that commitment and expectancy both contribute to increasing intent to remain. More specifically, it was found that only among those with both low commitment and low expectancy was there short term intent to remain.

Discussion

In general, the results of the present study support the contention that career-based variables are considered in the individual's membership decision. More importantly, the relationship between specific career-based variables and membership was investigated. The initial tests of Hypotheses 1 and 2 support the notion that the ceiling of a position's career line, the position's mobility opportunity, and its position ratio are important factors in the individual membership decision. No linear relationship between a position's transit time and either intent to remain or turnover was found. Surprisingly, there was no consistent relationship between transit time or the number of positions an individual had held previously and intent to remain, as would be predicted by the commitment proposition.

Secondary analyses of the data revealed three interesting relationships not predicted. The first was that when mobility opportunity and a variation of the ceiling variable were combined multiplicatively, the predictive power of career-based variables was increased considerably. The second relationship involved the transit time variable. Although the transit time of a position held no predictive power with respect to membership in the test of the hypotheses, it was discovered that the transit time of a position does seem to play a role in the membership decision. As individuals approach and then pass the position's transit time, intent to remain first drops and then increases. Finally, it was discovered that both commitment and expectancy must be considered simultaneously in predicting organizational membership.

This research began to answer some of the questions relative to careers and individual decision making, but a number of additional questions were generated and a number of the original hypotheses were revised through secondary analysis. These additional questions and revised hypotheses provide an excellent point of departure for future research in this area.

This research does provide strong support for the notion that mobility opportunity and turnover are negatively related, but a question regarding attachment in low mobility opportunity positions is raised. How can an organization attract, hold, and attain high performance from those in low mobility positions? A relevant research question is whether or not specific

pay grades or steps within a position act as a functional alternative to mobility between positions.

More research also is needed in the area of timetables. Secondary analysis of the data gathered for this research suggests that individuals do develop timetables for promotion and, once they pass the expected promotion point in time, there are changes in attitudes and behavior. For example, the analysis uncovered a pattern of decreased intent to remain for individuals beyond the transit time for a particular position. A number of important questions can be developed from this finding. How close are individual expectations to actual movement patterns? What is the variance among individuals in their timetables? What is the performance pattern of those who are passed over for promotion but who decide to remain in the organization at their current position? Do individuals, in fact, believe that not being promoted by a certain time in a position means no future promotions? These are all questions worthy of future research.

For career path measurement, there are some methodological changes that would be beneficial for future research of this type. Actual organizational rosters for various points in time would provide a more accurate assessment of career paths, mobility opportunity, and turnover than do self-reported career histories—especially when a high return rate cannot be assured. The availability of past rosters was a problem that could not be overcome in this research. It was found that many organizations interested in participating in this research project simply did not keep past rosters, and the personnel records that were kept were not in a form that made reconstruction of past rosters a practical exercise. With many large organizations using computers for personnel records, the likelihood is increased that the type of data needed for career path analysis will be more readily available in the future.

A major substantive issue with respect to career research of this type is raised by the findings of Rosenbaum's (1979) recent research. In examining career paths in large corporations, Rosenbaum found that his data supported a tournament model of mobility rather than a Markov model, as assumed in this research. The basic difference between the two models lies in the conceptualization of mobility opportunity. A Markov model assumes that each incumbent in a position has an equal likelihood of being promoted to the next position. This probability is measured in terms of past movement patterns from one position to the next. Rosenbaum's (1979) tournament model suggests that individuals entering a position from different entry levels have different mobility opportunities. Future research would be helpful if it attempted to assign differential mobility opportunities to individuals within a position based on their entry ports and then assessed the impact of those differential probabilities on employee membership and performance decisions.

Another related avenue of inquiry is suggested by the data. The model presented in this research suggests that when positions are linked in a career line, vacancies in the upper level position are filled from the pool of

incumbents in the position below. This means that individuals in the lower position can have a clear idea of who their competition is and thus they are able to assess their probability for advancement. When recruitment to the upper position is from outside the organization as well as from the position below, the competition becomes an unknown factor, leading to a decreased ability to predict mobility opportunity. The effects of this uncertainty present an interesting area of future research. How do individuals react to this uncertainty, which is different from low mobility opportunity, in making career decisions?

Another issue related to the topic of careers, but not specifically addressed by this research, is the issue of alternative external opportunity. The concept of the occupational career provides a framework for viewing this alternative opportunity. When career lines are unique to the organization, one would expect external opportunity to be lacking, thus increasing the attachment derived from the career line. Future research should consider the moderating effect of explicit occupational career lines on the relationship between the organizational career line variables and the membership decision.

Another issue not addressed by this research is that of career aspirations. For the purpose of this study it was assumed that if individuals had different mobility aspirations, they were randomly distributed throughout the sample. It is likely that individuals with low mobility aspirations are, in fact, far less sensitive to career line variables and are more concerned with specific features of their current positions. The differential effect of career line variables on individuals with different strength mobility aspirations is another relevant question for future research.

In summary, this research set out to assess the impact of organizational career line variables on the employee membership decision. Based on the reported findings, it seems that career variables such as mobility opportunity and the size of salary increase have the greatest impact on the membership decision. Models of employee membership should contain these variables in order to be accurate representations of actual practice. That is, these variables should be examined in addition to considerations such as the design of the job, the salary of the job, the behavior of their supervisor, and the structure of the unit. It seems that employees place importance on upward mobility in making the membership decision.

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The Cognitive Component in Locke's Theory of Goal Setting: Suggestive Evidence for a Causal Attribution Interpretation

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Two laboratory experiments examined the role of causal attributions as the cognitive component in Locke's (1968) model of goal setting. Environmental incentives were found to be subject to causal interpretation but not to affect goal aspirations per se. A strong interaction between environmental incentives and causal attributions on goal aspirations was found.

Locke (1968) has proposed a theory of task motivation explicating the effects of incentives such as knowledge of results (KR) and participation in goal setting on task performance. His basic contention is that task performance is not caused directly by the presence of incentives such as KR and participative goal setting, per se. Rather, it is determined by one's cognitive interpretation and evaluation of the incentive and the goal aspirations that evolve from this cognitive process. Simply stated, Locke hypothesizes that (1) KR and participation lead to a mental evaluation and cognition of the task situation resulting in goal aspirations and (2) these goal aspirations determine task performance. This latter contention has been adequately tested and supported by numerous studies (Ivancevich, 1977; Kim & Hamner, 1976; Latham & Yukl, 1975b, 1976; Locke, Shaw, Saari, & Latham, 1981). However, the role of evaluation and cognitions as an intervening factor in the participation, KR and goal aspiration relationship has neither been supported nor refuted (Latham & Yukl, 1975a; Tolchinsky & King, 1980).

Given the temporal sequence of events posited by Locke, attribution theory serves as a potentially useful explanatory framework for the cognitive processes inherent in Locke's thesis. It describes the role of cognitive and

perceptual factors in individual reactions to events (Jones & Davis, 1965; Kelley, 1967, 1973; Weiner, 1972, 1974). According to Locke (1968), one's perception and evaluation of incentives such as KR and participation result in intentions and/or goal aspirations. In a broad sense, attribution theory is concerned with the perception, interpretation, judgment, and evaluation of events (Kelley, 1973) and, therefore, the use of attribution as the evaluation and cognition component in Locke's model would facilitate the examination of the role of cognitions in the model.

Specifically, attribution theory suggests that individuals act as "naive" psychologists and are motivated to examine the causes of an event to obtain a cognitive explanation of the causal structure of their environment. Weiner (1972) has arrived at a causal schemata suggesting that individuals in achievement situations often assign causality to four sources, namely, ability, effort, task difficulty, and luck, which vary along two dimensions—internal-external and stable-unstable. Although other potential causal dimensions have been proposed (Weiner, 1979), these two fundamental dimensions are most applicable to the present study. Internal attributions are those that explain the causes of one's behavior in terms of factors that are within the person (one's ability and amount of effort expended). External attributions are beliefs that behavior is caused by factors in the environment (difficulty level of task and experienced luck). Stable attributions refer to those factors that are relatively unchanging over time (ability and task difficulty), whereas unstable attributions are those that are variable (effort and luck). Several studies (Feather & Simon, 1971; Frieze & Weiner, 1971; Luginbuhl, Crowe, & Kahan, 1975) provide data indicating that people use knowledge of performance to assign causes to the four factors postulated by Weiner. Moreover, these four types of ascriptions, so commonly used in attribution research, have been shown to account for a large portion of the causal inferences made by subjects (Frieze, 1976).

One of the most powerful implications of attribution theory is that individuals utilize behavior or performance outcome information as a primary cue by which they cognitively evaluate and ascribe characteristics or causes to one's actions (Downey, Chacko, & McElroy, 1979; Staw, 1975). Although performance data have been empirically shown to be extremely salient pieces of information, other situational cues have been hypothesized to affect causal ascription. Chacko, Stone, and Brief (1979), for example, have argued that involvement or participation in the goal setting process will negatively affect the degree to which successful performance is attributed to internal factors. That is, feelings of success and the desire to attribute success to internal task-relevant abilities is dampened by the knowledge that one affected the situation in order to increase the chance of success. If Locke's thesis is valid, then, an attributional interpretation of the cognitive evaluation process linking environmental incentives to goal aspirations would predict an interaction of causal attributions with KR and the mode of goal setting as determining future goal aspirations.

Two studies were conducted to examine the untested portion of Locke's thesis: Environmental events, such as KR and the mode by which goals are set (i.e., degree of participation), are hypothesized to elicit individual cognitions and evaluations. These cognitions, in turn, are contended to determine one's goal aspirations.

Study 1

Study 1 examines the aspect of Locke's goal theory that postulates that one's cognitions and evaluations may be affected by KR information and the manner in which goals are set. In particular, the effects of participative versus assigned goal setting and of success versus failure KR on causal attributions are examined. In addition, the effects of these manipulations on goal aspirations and the potential mediating effects of one's ascribed causes on the effects of KR and participation are tested. Specifically, *it is hypothesized that both KR and goal setting mode will have main and interaction effects on causal attributions but not on aspiration level.*

Participating in the study were 60 male and 32 female undergraduate students in business. Participation was a partial fulfillment of the course requirements. The mean age of the subjects was 20.8 years, and the standard deviation was 1.2 years. The experimental task consisted of proofreading a manuscript in which the subjects detected errors such as misspellings, typographical mistakes, incorrect punctuations, and grammatical errors.

Procedure

In groups of 6 to 10, the subjects were first instructed on the task and provided with a "cover" story. They were told that the study was to measure competence of students in terms of general aptitude. It was stressed that similar tasks under time constraints are utilized in certain aptitude tests. They were then given a short example and randomly assigned a goal or were allowed to influence the goal. On completion of the task, the proofread manuscripts were taken out of the room to be evaluated. The subjects then were given falsified reports of their performance. Half the subjects were given positive feedback. The other half were given negative feedback. Next, the subjects were asked to take part in a second proofreading task comparable to the first one. It was stressed that this was essential as a reliability measure for the experiment. All of them consented to this request. But before they attempted the task they were asked to fill out a short questionnaire which included a goal aspiration measure and some biographical items. The subjects were instructed that the purpose of this questionnaire was to arrive at a performance profile for each of the subjects and to get their reaction to the experiment. On the completion of this questionnaire, the experiment was terminated and the subjects debriefed.

Manipulations

The goal setting mode manipulation was achieved by varying the degree of influence that subjects had in determining their goals on the proofreading task. Subjects in the assigned goal condition had to detect at least 70 percent of the errors in the manuscript. They were instructed that a majority of college students were able to detect at least 70 percent of the errors in manuscripts of comparable length and difficulty. This was to reinforce the reasonableness and realism of the assigned goals. On the other hand, the other half of the subjects were able to participate in the goal setting process. The subjects in this participative condition, when discussing the example of the task, were asked to set a goal in terms of the percent of errors they would shoot for in 15 minutes. During this discussion, the experimenter provided additional information to each subject in order that more reasonable and realistic goals might be set. Then these subjects, like the assigned goal subjects, were provided with information that earlier testing had shown that most college students detected 70 percent of the errors in manuscripts of comparable length and difficulty within a 15-minute period. Actually, the information given to the assigned and participative groups was not that different. In the former case, subjects were given the 70 percent goal without any discussion except for the above rationale. The participative group was asked to consider the example as an indicator of the task to be done in terms of difficulty and content and the need to set realistic/attainable goals. Providing the same 70 percent standard or yardstick helped control for differential goal levels across the two goal conditions. In fact, it was found that the goals set by those in the participative condition ($\bar{x} = 72.9$; sd = 3.2) were right around the 70 percent standard of the assigned goal subjects. For all practical purposes, this difference in actual goal levels is not significant ($z = .89$, n.s.).

The KR manipulation was achieved by providing the subjects with "falsified" reports about their performance on the proofreading task. The subjects were told the percent of errors they had detected and whether they had or had not achieved the goal. The positive KR subjects were given reports indicating that they had met the goal. The negative KR subjects received reports indicating that they had not met the goal. It should be noted that the goal in terms of percentage of errors was concrete, but the subjects on their own were unable to assess accurately or to interpret their performance in either a positive or negative manner because the goals were set in terms of percentages rather than number of errors detected. The subjects may have had a rough idea of the number of errors they had checked, but they did not know the proportion of this to the total number of errors in the manuscript. The false feedback, therefore, was more plausible.

Causal Attribution Measure

The causal attribution measure was obtained by asking the subjects to attribute their performance on the task to the four causal sources mentioned

by Weiner (1974). Specifically, in this study the subjects given knowledge of success attributed their performance to their ability, effort expended, easiness of task, and good luck. The failure subjects attributed their performance to lack of ability, lack of effort, task difficulty, and bad luck. They were asked to indicate in percentage points the degree to which each factor was a source or determinant such that their responses to the four causal factors would sum to 100 percent. This measurement procedure (percentages) was used because of the interdependency among the different attribution factors. Kelley (1973) indicates that as the causal importance of an attribute increases, the importance of other attributes may decrease. Such tradeoffs are made possible by this attribution measure. Based on Weiner's two-dimensional scheme, an internal attribution score and a stability attribution score were derived. The former was obtained by summing the attributions made to ability and effort minus the sum of attributions to task difficulty and luck. The latter was created by summing the attributions to ability and task difficulty and subtracting the sum of the attributions to effort and luck. This procedure was deemed appropriate, given the interdependent status of the variable and the high variability associated with the use of the individual attributions as the major causal explanation for performance.

Goal-Aspiration Measure

The goal aspiration score was obtained by summing subject responses to two Likert-type scales. These were: "If I am to proofread comparable manuscripts in the future, I would like/hope to be able to do better" and "I intend/desire to reach my goal next time." The estimate of internal consistency (coefficient alpha) was .73 for this measure.

Results and Discussion

Evidence on the effectiveness of the experimental manipulations strongly indicates that both KR and goal mode treatments had the intended effects. Responses to two 5-point scales (alpha reliability coefficient = .85) showed how well the subjects thought they performed and whether or not they were successful in meeting their goal. The mean scores for the success subjects (8.24) and the failure subjects (4.8) were significantly different ($t = 9.51$; $p \leq .001$). Subjects responded to two other 5-point items (alpha reliability coefficient = .75) measuring their perceptions of their freedom and influence in goal setting. The mean scores for the participative goal subjects (7.7) and the assigned goal subjects (4.6) were also significantly different ($t = 7.00$; $p \leq .001$).

Table 1 gives the analysis of variance results on the internal and stability dimensions of causal attributions as well as the goal aspiration measure. A consistently significant KR main effect was found for all three dependent variables. This is not surprising because attribution research has

Table 1
Effect of Goal Setting Mode and KR on Causal Attributions and Goal Aspirations

		Dependent Measures								
		Internal Attribution Dimension			*Stability Attribution Dimension*			*Aspiration Level*		
Source	*df*	*MS*	*F*	*Prob.*	*MS*	*F*	*Prob.*	*MS*	*F*	*Prob.*
Goal setting mode (A)	1	13916.3	10.01	.002	3347.6	2.07	.15	1.9	.68	.41
Knowledge of results (B)	1	36043.9	25.92	.000	19256.1	11.92	.001	14.8	5.32	.02
A×B	1	14557.3	10.47	.002	4731.3	2.93	.09	.02	.01	.93
Error	88	1390.4			1615.6			2.8		

shown consistently that knowledge of performance is an extremely potent cue, not only in influencing one's causal attributions (Jones & Davis, 1965; Nisbett & Valins, 1971; Weiner, 1974), but also in interpreting and describing events and situations (Downey et al., 1979; Staw, 1975). The goal setting mode significantly influenced internal attributions but had no impact on either stability attributions or goal aspirations per se. The interaction effect, on the other hand, was statistically significant for internal attributions, marginally significant for the stability dimension, but was not significant for the aspiration measure.

These results support Locke's postulation that events such as participation in goal setting have no direct effect on future goal intentions or aspirations but are more likely to affect one's cognitions and evaluation, such as assigning causality of action. However, the direction of the goal mode main effect was not as one would intuitively expect. Subjects in the assigned goal condition had a greater mean score on the internal attribution dimension (46.9) than did those in the participative condition (22.3). The significant interaction effect revealed that this phenomenon was exacerbated under the failure KR treatment. In fact, Luginbuhl's (1972) experiment with college students working on achievement tasks found that those who had a choice on the task felt less personally responsible than did those who had no choice. Both Chacko et al. (1979) and Luginbuhl (1972) have suggested that subjects who are allowed to participate may perceive that they had the opportunity to influence directly the nature of the task. They, therefore, may be more likely to ascribe the tasks, rather than ability or effort, as a causal explanation/factor. On the other hand, the lack of subjects' influence over the task of the assigned goal may have left them with no causal alternative other than their own actions, namely, effort. This notion was supported in an analysis of the responses to the individual attribution factors. Participative-goal subjects, compared to subjects who were assigned a goal, made greater task difficulty attributions (30.4 vs. 20.3; $p \leq .05$) and lower effort attributions (18.4 vs. 26.7; $p \leq .05$). Although one cannot be certain, it is possible that the goal setting modes provide certain cues to people that may increase or decrease the saliences they attach to the task

or personal factors. For instance, in the participative condition, the task may become more salient as a possible cause than in the assigned condition.

The results, however, show some support for an attributional interpretation of Locke's cognitive component in that KR and participation have substantially stronger effects on causal attributions than on goal aspirations. The use of causal attributions as a dependent measure does not allow for a test of Locke's total argument. His contention, therefore, that cognitions and evaluations, such as assigning causality, directly affect goal aspirations formed the basis for a second study. In this experiment, it was deemed necessary to determine how the different types of causal attributions interact with environmental incentives in forming goal aspirations. Thus, the research design was expanded to a $2 \times 2 \times 4$ factorial. Here, the causal attributions were manipulated along with KR and the goal setting mode in order to determine their effect on goal aspirations as well. Given the sequential process of Locke's model, manipulating attributions provides a test of causality that is required in dealing with such process issues.

Study 2

Study 2 was conducted in order to explore further the effect on goal aspirations of the cognitive processes that follow "incentives" such as knowledge of results and participation. *It is hypothesized that causal attributions will interact with environmental incentives in the formulation of goal aspirations.* In order to manipulate the attributions employed by individuals, written scenarios, described below, were prepared. Subjects were instructed to place themselves in the role of the individual being described in the scenario. This role playing format was deemed appropriate, given that attribution research has demonstrated that role players tend to make the same attributions as active participants (Bem, 1972). Although it is essentially a means of manipulating attributions with hypothetical data, it does provide a mechanism for determining the impact that specific attributions will have on goal intentions.

Participating in the study were 210 junior and senior level management students. Participation was part of a course requirement. Each student's participation was quasi-voluntary. That is, although required to examine the experimental materials for the purpose of a later class discussion on information processing and attitude formation, each student decided whether to participate by completing the questionnaire.

Experimental Material

Each subject received a written scenario concerning a student's experience in a course. Each scenario contained three pieces of information: course and grading requirements, performance on the first of three exmaminations, and attributional information. One piece of information was used to manipulate the manner in which a passing grade (goal) was established

(a professor assigned a 70 percent passing score versus a student-professor negotiated 70 percent passing score). Performance information was used to operationalize knowledge of results (success/failure). The student in the scenario was described as just receiving feedback on the first course examination (succeeding versus failing to achieve the 70 percent). Finally, each script contained information on the following attributional causes for the first examination performance: ability, effort, exam difficulty, luck. Causal attributions were manipulated by presenting information emphasizing one of the above factors and at the same time ruling out the other three possibilities. For example, if ability was to be the attributed cause for examination performance, subjects received the following information for the success (failure) conditions:

> Being familiar with most of the students in the class from other classes, you quickly came to the conclusion that your basic aptitude for the material being covered in this course was significantly above (below) that of your classmates. This class was going to be well suited to your abilities (this was going to be one of those classes in which you are "in over your head").

In addition to this ability information, information on effort, exam difficulty, and luck was presented but in such a way that they were not emphasized as possible causes of performance. For example:

> Having talked with many students in the class and having studied with others, you realize that your amount of preparation for the examination was consistent with that of the other students. You found the exam to be of average difficulty and did not purely guess on any of the questions.

In those cases in which one of the other factors (effort, exam difficulty, luck) was emphasized as the cause of performance, information on the remaining factors was presented in a similar manner.

Procedure

Each subject was presented one version of the scenario and asked to assume the role of the student being described in the script. The manipulations contained in the scenarios constitute a $2 \times 2 \times 4$ experimental design crossing two modes of goal setting and two levels of performance with four causal attributions. On studying the information provided, each subject was asked to respond to an opinion formulation questionnaire.

Dependent Measure

A 2-item aspiration scale was developed in order to measure subject aspiration levels for the next examination. The following two items exhibited sufficient internal consistency (Cronbach alpha = .75) to be summed.

> Given your score on exam 1, what score will you be striving to achieve on the next exam?
>
> Given your score on exam 1, what would you predict your score on the next exam to be?

Both items employed a percentage test score format with response choices ranging from 40 percent to 95 percent, with 5 percent intervals.

Results and Discussion

Manipulation Checks. Single-item questions using a 7-point Likert scale were used to verify the success of the intended independent variable manipulations. Goal mode, assigned versus negotiated, was assessed via a question tapping the degree to which subjects perceived they had no influence in establishing the passing grade cutoff point. A question asking for subjects' perceptions of their degree of success in meeting the set standard on the first exam was used to measure the believability of the knowledge of results variable. Finally, four questions were used to evaluate the manipulation of the performance attributions. Each question measured the degree to which subjects perceived their test performance as reflecting their ability, effort, the difficulty of the exam, or luck, respectively. The four items linked to the performance feedback (success/failure) were:

1. It is my belief that my performance on the first exam was basically because of my ability (lack of ability).
2. It is my belief that my performance on the first exam was basically because of the effort I expended (I did not put forth the effort).
3. It is my belief that my performance on the first exam was basically because the exam was not that difficult (too difficult).
4. It is my belief that my performance on the first exam was basically because of a favorable set of circumstances, e.g., good luck (an unfortunate set of circumstances, e.g., bad luck).

Results showed that subjects given the assigned goal scenario reported lower mean scores on measures concerning their perceived degree of influence in establishing the cutoff score (5.51) than did those presented the negotiated goal scenario (2.91, $t = 12.26$). In addition, subjects given favorable knowledge of results information perceived a higher mean level of success in meeting the established standard (5.85) than did those receiving unfavorable results (2.57; $t = 19.2$). Both of these mean differences were in the expected direction and were statistically significant ($p \leq .001$).

The effectiveness of the attribution manipulations was assessed by comparing the mean for the intended manipulation with the average of the other three attributional possibilities. That is, if effective, a subject given an ability treatment scenario should perceive ability as a more fundamental cause of performance and thus give it a higher rating than would those given scenarios of manipulating effort, exam difficulty, or luck as possible causes. Results showed that those subjects given the ability treatment scenario perceived ability as a greater cause of exam performance (4.49) than did those subjects receiving other manipulations (3.50; $t = 3.09$; $p \leq .01$). Similarly, those subjects receiving the effort treatment scenario reported a higher mean for effort as a cause (5.15) than did those receiving the other attributional manipulations (4.10; $t = 3.78$; $p \leq .001$). Those receiving the exam difficulty scenario rated exam difficulty higher (4.46) than did the others (3.22; $t = 5.70$; $p \leq .001$). Those presented with the luck treatment rated luck as a greater mean cause of exam performance (4.71) than did those receiving the other attribution scripts (2.91; $t = 7.66$; $p \leq .001$).

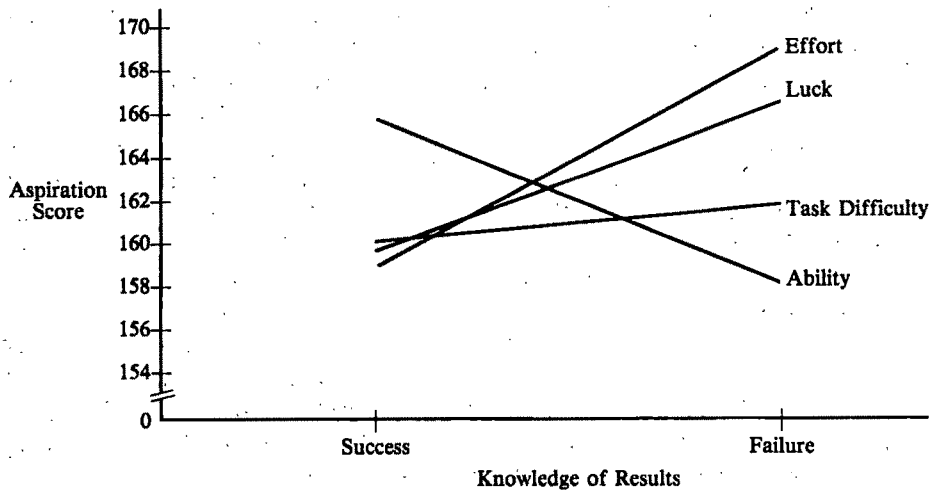
Table 2
Effect of Goal Mode, Knowledge of Results, and Causal Attributions on Aspiration Level

Sources	*df*	*MS*	*F Value*	*Prob.*
Goal mode	1	33.77	.11	.74
KR	1	417.81	1.41	.24
Attributions	3	122.39	.41	.74
Goal mode × KR	1	15.04	.05	.82
Goal mode × attributions	3	59.33	.20	.90
KR × attributions	3	771.23	2.61	.05
Goal mode × KR × attributions	3	898.63	3.04	.03
Error	194	295.47		

Dependent Variable. Table 2 shows the results of the analysis of variance performed using the 2-item aspiration scale as the dependent variable. No significant main effects were found. In fact, according to Locke's (1968) theory, it is unlikely to expect either goal mode or KR to have a direct effect on goal aspirations. The lack of an attribution main effect also is not surprising because one's causal reasoning and evaluation per se does not really exist independent of an event or situation. Causal attribution is the cognitive process individuals use in structuring their environment or in describing their situation. Locke and the attribution theorists have suggested that KR has a cognitive component that regulates intentions as well as actions. This is borne out, in fact, in the significant KR-attribution interaction effect on aspiration levels in the current study.

Figure 1 depicts the interaction effects between success and failure feedback and the four causal attribution components. Subjects in the success

Figure 1
Interaction of KR and Attributions on Aspiration Levels



KR group were found to express higher aspirations only when they cognitively attributed their success to ability. Whereas, the failure KR subjects showed higher aspiration levels if they were in either the effort or luck attribution subgroups rather than if they were in the ability or task difficulty subgroups. These results are consistent with attribution research (Fontaine, 1974; McMahan, 1973) in that stable causal factors such as ability result in typical aspirations and variable factors such as effort and luck result in atypical aspirations. Specifically, individuals who evaluate achievement settings as relatively stable and unchanging are likely to anticipate similar outcomes (KR) in the future. Thus they are likely to express lower aspirations under failure feedback conditions and express higher aspirations under success feedback conditions. On the other hand, those who make attributions to unstable factors are likely to anticipate a future change. This would be particularly true if the individuals received failure feedback the first time. Again, Figure 1 succinctly shows these shifts in aspiration levels.

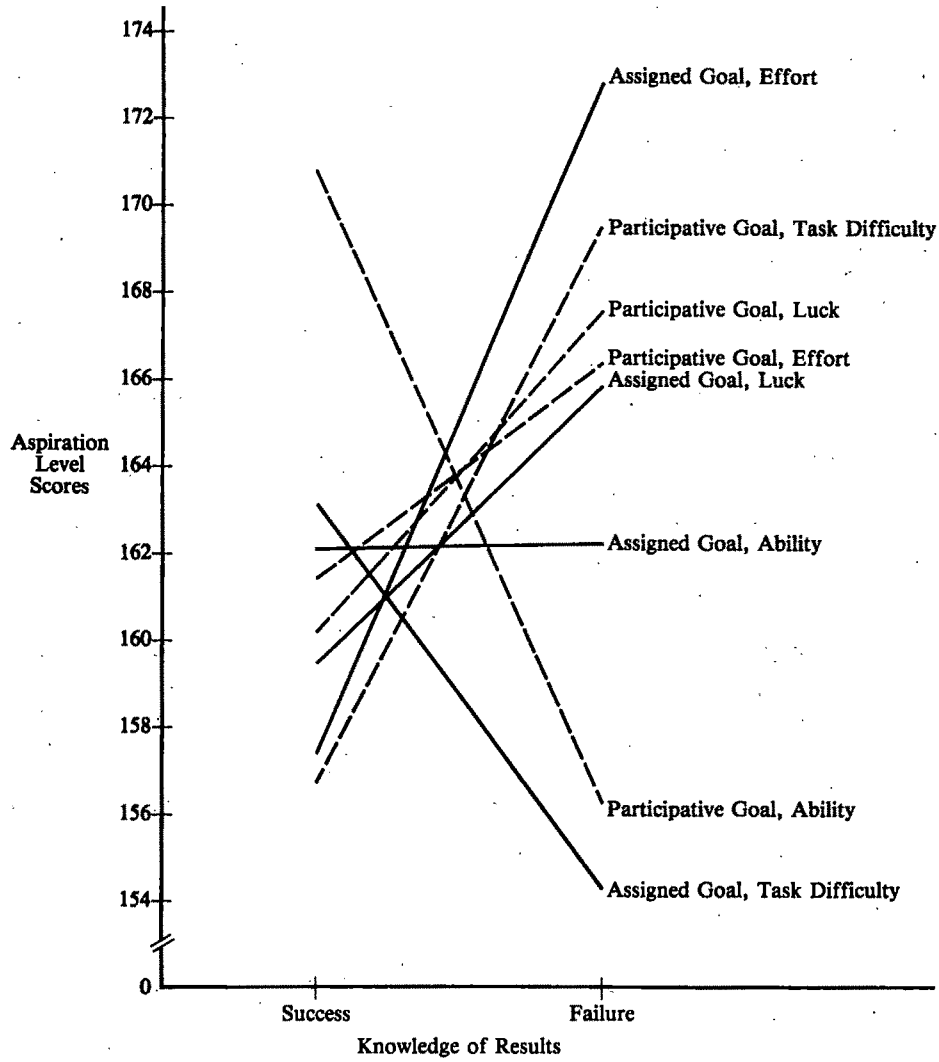
Finally, significant 3-way interaction effects among goal mode, KR, and causal attributions were obtained in this study. This again suggests that the cognitive element of causal attributions is critical for both goal mode and KR to influence goal intentions and aspirations. Figure 2 illustrates these 3-way interactions, which are quite similar to the 2-way interactions, especially in the cases of effort and luck attribution groups. In the case of subjects in the task difficulty attribution group, assigned goals rather than participative goals led to higher aspirations following success KR and lower aspirations following failure KR. These differences, however, were not statistically significant. For subjects in the ability causal attribution group, participation rather than assignment of goals resulted in higher aspirations following success KR ($F=2.93$; 1,25) and lower aspirations following failure KR ($F=4.73$; 1,24).

Given the equivocal findings regarding the effects of participation in goal setting, researchers (Latham, Mitchell, & Dossett, 1978; Locke et al., 1981) have suggested that participation affects performance only when it leads to higher goals or to greater goal acceptance. The present study is particularly useful in describing when participation would lead to higher goals. The findings suggest that one's cognitions/attributions regarding ability as a causal explanation for participatively set performance goals are likely to affect goal aspirations or intentions. No such effect was seen in the assigned goal mode. Therefore, these findings not only are consistent with but also extend the conclusions made by recent studies (Latham & Yukl, 1976; Latham et al., 1978) regarding the influence of participation on the difficulty level of goals.

Conclusions

The results of these two studies lend support to the notion that goal aspirations are the result of a cognitive evaluation of environmental incentives that includes causal attributions. Study 1 shows that environmental incentives

Figure 2
The Interaction of Goal Mode, KR, and Attributions on Aspiration Level



such as the mode of goal setting and knowledge of results are subject to causal interpretations. Study 2 illustrates the connection between these causal explanations and goal aspiration levels. These findings, taken together, support the use of causal attributions as a cognitive component in Locke's (1968) model of goal setting. These findings also point out the role played by cognitions (i.e., attributions) in delineating the conditions under which individuals will vary their goal intentions. This is particularly important, given that goal setting researchers (Locke et al., 1981) have suggested that the setting of higher aspirations is a more critical issue than is goal setting per se.

The degree to which goal aspirations are the result of causal attributions warrants a closer look at the process by which individuals attach attributions to performance outcomes. For example, as shown in Figure 1, individuals who view performance as the result of their abilities are likely to maintain high goal aspiration levels in light of continued successes but to lower their aspirations in the face of poor performance. One managerial implication arising from this concerns the degree to which managers are able to aid and abet this attachment process. Is it possible, for example, for managers to manage actively the context in which attributions occur such that individuals can be persuaded to attach successful performance to their abilities yet disassociate themselves from failures? Although the potential to affect subordinate attribution processes remains an empirical question, it seems intuitively possible. Internal attributions are more likely, according to Kelley (1967), to the extent that the performance meets the criteria of distinctiveness, consistency, and consensus. To the degree that a manager can control the presentation of this information to subordinates, he or she should be able to influence the extent to which attributions are internally or externally oriented.

Figure 2 illustrates that the context in which goals are set exacerbates the need on the part of managers to assist their subordinates in making the right cognitive connections. Either assigned or participative goal setting can have a positive or a negative impact on goal aspirations, depending on the performance outcome and the cognitive explanation for the performance. Recently, Latham and his colleagues (Latham et al., 1978; Latham & Saari, 1979) have found that the degree of supportiveness shown to subordinates by managers positively affects the goals set by individuals. According to them, supportive behavior on the part of managers increases understanding of the performance situation. It also creates a sense of personal worth in the subordinates and thereby affects the cognitive response to goal setting modes. The results of this study imply that both participative and assigned goal setting lead to higher goal levels only to the extent that the individual can make certain cognitive connections for performance. For instance, participatively set goals that lead to success will result in high aspirations if ability is seen as the cause of the performance. However, should the performance outcome be negative, attributions to ability will result in low goal aspirations. The same scenario applies to assigned goals if task difficulty is seen as the cause of performance. Should further research bear out this contention, managers could make better use of participative goal setting by influencing subordinates to attach successes to abilities and offering other causal attributions in the face of failure. Similarly, the use of assigned goal setting will be improved if managers cognitively connect good performance outcomes to task difficulty and poor performance to the other causal possibilities.

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Attribution Theory and Strategic Decision Making: An Application to Coalition Formation[1]

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Attribution theory was used to predict how members and nonmembers of dominant coalitions would explain the reasons for membership. As predicted, members made stronger attributions to ability and desire, and nonmembers made stronger attributions to luck.

The process by which group members form alliances or coalitions has been studied by game theorists (von Neumann & Morgenstern, 1944), social psychologists (Caplow, 1956), and political scientists (Riker, 1962). (Murningham, 1978, gives a review of the literature and models in each area.) In addition, as organizational theorists began to view work organizations as political entities (Cyert & March, 1963), they also became more interested in coalition formation. It became clear that organizational goals and policies changed as coalitions formed, were able to dominate organizations, and were eventually replaced by other coalitions. In fact, some researchers (Gamson, 1961) have suggested that coalitions are formed with exactly these purposes in mind: influencing goals, policies, and the allocation of resources in the organization. As such, it is not surprising that Duncan (1976) argues for the importance of coalitions as a topic for organizational research.

Such research, however, is still at an infantile stage, with researchers concentrating on such variables as cohesion among coalition members (Meltz, 1967) and the political ideology of coalitions (Lipset & Rokkan, 1967) rather than on how coalitions are formed. The more basic questions would seem to be concerned with how people come to be included in coalitions, especially if attention is focused on the strongest, or dominant, coalition in the organization. It therefore seems reasonable to study the way that the people

[1]The authors would like to thank W. Jack Duncan of the University of Alabama at Birmingham for his constructive comments.

involved in coalition formation *believe* their coalitions were formed; that is, how they explain why some people became members of a dominant coalition and others did not.

Some insight into this issue of dominant coalition memberships may be provided by attribution theory, which Kelley has defined as the "process by which an individual interprets events as being caused by a particular part of an environment" (1967, p. 193). Attribution research, then, is concerned with the "why" of events, and it can be useful in exploring how managers explain membership (or nonmembership) in dominant coalitions.

In addition to offering possible causes of events and describing how people come to choose one explanation or another, attribution theory suggests consequences of attributing an event to the different causes. For example, Weiner and his associates (Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum, 1971) suggest four basic causal explanations for success or failure in any endeavor: ability or skill, effort, the nature of the task, and luck. Others (Fitch, 1970; Weiner & Kukla, 1970) have reported a tendency to attribute success to two of these causes—the internal causes of ability and effort. They further report a tendency to attribute failure to external causes—i.e., forces beyond the respondent's control, such as the nature of the task and luck.

Weiner et al. (1971) note that ability and the task are unlikely to change over time, and thus they are stable causes; but effort and luck may well change, and thus they are unstable causes. This distinction, they report, has serious implications for anticipated success or failure in the future. For example, a person is more likely to believe that he or she will succeed in the future either if present success is attributed to a stable cause (ability or an easy task) or if present failure is attributed to an unstable cause (insufficient effort or bad luck). Failure attributed to a stable factor, on the other hand, has been found to result in the person not attempting the task again, because he or she has no reason to expect to do any better in the future (Weiner et al., 1971). Thus, as concerns this study of dominant coalitions, an attribution theory approach might give some indication about the long term stability of the coalitions.

The present paper presents a study designed to investigate the attributions made for membership in the dominant coalitions present among the board members of several banks, by both members and nonmembers of those coalitions. Thus, the present study represents the application of a well-known theory from social psychology to the understanding of why executives and board members feel they were or were not successful in attaining membership in the dominant coalitions in their organizations. In addition, because demographic data also were available for these people, it was possible to explore relationships between demographic variables and membership in dominant coalitions and between demographic variables and attributions for membership in those coalitions. Finally, the present study represents a contribution to the body of research on attribution theory.

It applies the theory in a unique field setting (top executives in the banking industry) to an interesting problem (membership in dominant coalitions).

Assuming that executives and board members view inclusion in a dominant coalition as an indicator of success, it is predicted that:

H.1: Dominant coalition members should attribute membership to internal factors such as ability or effort (desire to be a member); nonmembers should attribute membership to external factors such as task (nature of decisions made) and luck.

Because the attribution literature gives no indication of differences due to demographic factors and because many of these people probably have had similar work experiences as they moved up to their present positions, it also is predicted that:

H.2: Demographic factors should not produce different patterns of attributions for success and failure.

All analyses not dealing with these two hypotheses were exploratory.

Method

Sample and Procedures

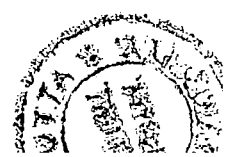
All data were collected using a self-contained questionnaire packet developed for this study. The eight commercial banks selected as data sites were all owned through publicly held stock and shared a common competitive marketplace (all were within a 50 mile radius), but they represented a diversity in size (deposits ranged from $25 million to $199 million). Each bank was small enough to accept the claim of each CEO that there was some degree of interaction among board members and executive officer.

The questionnaire packets were hand delivered by the researchers to the officers and board members of the participating banks at sessions preceding monthly board meetings. A copy of the instructions was given to each participant, along with definitions of key concepts. The final sample included all 73 board members of the 8 participating banks and their top 64 executive officers at the level of vice president or above, including 20 officers who also served on the boards of directors.

Questionnaire Measures

In order for the participants to be able to respond accurately to the questionnaire items, it was imperative that they understood and shared the meaning of two key concepts: strategic decisions and dominant coalition. Therefore, the questionnaire included the following definitions, which also were read aloud by the researchers for emphasis:

> *Strategic decisions*—the set of decisions that result in the formulation and implementation of strategies designed to achieve the major objectives of the firm. Such decisions involve long term, future oriented, complex issues which necessitate action by the board of directors and top management because of the extent of resources required to accomplish a competitively and environmentally opportunistic plan.



> *Dominant coalition*—the alliance of a subgroup of individuals who exchange information and support and who normally are successful in influencing the outcomes of overall group decisions. Thus, the dominant strategic coalition is that subgroup of company managers and/or board of directors who, through reciprocal support over time, most successfully influence the outcomes of strategic decisions.

Participants were asked to rate the importance of four potential causes of membership in the bank's dominant coalition. These four causes were: ability as a decision maker, type of decision being made (which addressed the nature of the task for which the coalition was formed), desire to be a member (which it seemed reasonable to assume would relate to effort expended to become a member), and nonperformance factors or luck. Each cause was rated on a 4-point scale ranging from "of great importance" (1) to "of no importance" (4). In addition, participants were asked to indicate their highest level of education, age, years at present position, and number of years with the bank.

Finally, participants were asked if they believed the present dominant coalition had changed (at all) in the past year or had remained stable; whether the respondent was an officer of the bank, a member of the board, or both; and whether or not the respondent was a member of the dominant coalition. This last item was of course critical, and there was some apprehension about the validity of such a self-report. In the present study, however, it was felt that a great deal of confidence could be placed in this data for several reasons. First, because all responses were known to be confidential, there was no incentive to claim membership falsely in the dominant coalition. Second, because discussions following the meetings revealed that everyone had understood the instructions and definitions provided, there was no reason to believe that anyone was confused concerning membership. Finally, and probably of greatest importance, to be categorized as belonging to the firm's dominant coalition a respondent needed both to proclaim self-membership and to be named reciprocally by at least 75 percent of the individuals whom he or she had identified as dominant coalition members.

Results

Attributions for membership in the dominant coalition by members and nonmembers provided general support for the hypothesis that members would make stronger attributions to external factors. As seen in Table 1, members were more likely than nonmembers to attribute membership to ability and desire to be a member (lower mean ratings indicating stronger attributions), and nonmembers were more likely to attribute membership to luck, both as predicted. Members also were more likely, however, to attribute membership to the type of decision being made, which is an external factor. This, therefore, was contrary to the prediction. Additionally, nonmembers were more likely to attribute membership to a desire to be a member (i.e., effort)—a finding that was counter to the hypothesis and the conceptual literature. The standardized discriminant function

Table 1
Attributions to Ability, Type of Decision, Desire, and Luck by Various Groups: Discriminant Analysis Results

Type of Attribution	*Coalition Member (N=65)*	*Nonmember (N=70)*	*Discriminant Analysis Results*		
			Standardized Coefficient[b]	*Canonical Correlation*[c]	*% Correctly Classified*[d]
Ability	1.26[a]	1.73	.44**		
Type of decision	1.58	1.96	.23*		
Desire	2.22	2.57	.27**		
Luck	3.25	2.58	-.70**	.44**	69.4**
	College graduate (n=100)	*Nongraduate (n=37)*			
Ability	1.50	1.59	.05		
Type of decision	1.78	1.81	.06		
Desire	2.46	2.57	-.34		
Luck	2.37	3.04	1.01**	.28**	66.9**
	Less than 55 yrs. old (n=87)	*55 yrs. and older (n=50)*			
Ability	1.52	1.54	-.15		
Type of decision	1.84	1.70	.18		
Desire	2.68	2.16	.71**		
Luck	3.05	2.54	.62**	.34**	61.8*
	Less than 5 yrs. at position (n=29)	*5 yrs. or more at position (n=106)*			
Ability	1.66	1.49	.27		
Type of decision	2.00	1.73	.31		
Desire	2.86	2.42	.47*		
Luck	3.24	2.76	.73**	.28*	65.7**
	Less than 10 yrs. with bank (n=17)	*10 yrs. or more with bank (n=117)*			
Ability	1.41	1.55	.30		
Type of decision	2.06	1.77	.28		
Desire	2.47	2.51	.31		
Luck	3.24	2.83	.86**	.27*	64.7**
	Coalition was stable (n=101)	*Coalition changed (n=24)*			
Ability	1.50	1.29	.36		
Type of decision	1.76	1.71	-.26		
Desire	2.62	2.00	.86**		
Luck	2.92	2.71	.33	.28*	61.3*
	Board member (n=73)	*Bank officer (n=64)*			
Ability	1.45	1.62	.32		
Type of decision	1.80	1.78	-.43		
Desire	2.28	2.73	.92**		
Luck	2.95	2.76	-.36	.28*	57.9*

[a]Entries are mean attributions for group members.

[b]Standardized discriminant coefficients. Significance indicates whether or not a particular attribution discriminated between subgroups.

[c]Canonical correlation coefficient for the discriminant function. Significance pertains to the correlation itself and not the redundancy coefficient.

[d]Values result from efforts to classify cases on the basis of the discriminant function. In all cases, the base rate for correct classification is 50%. Significance is tested by a chi-square test.

*$p < .05$

**$p < .01$

coefficients for all four attributions were significant ($p < .05$ or better), as was the resulting canonical correlation (.44, $p < .01$).

As also seen in Table 1, the results provided mixed support for the second hypothesis, that demographic differences would be washed out due to the homogeneity of bank management. Discriminant coefficients were

Table
Attributions by Membership in

	Dominant Coalition Members (N=64)				
			Discriminant Analysis Results		
Type of Attribution	*College Graduate (N=48)*	*Nongraduate (N=16)*	*Standardized Coefficient*[b]	*Canonical Correlation*[c]	*% Correctly Classified*[d]
Ability	1.25[a]	1.31	−.02		
Type of decision	1.54	1.69	.31		
Desire	2.25	2.56	.67		
Luck	3.33	3.00	−.91	.26	57.8
	<55 yrs. old (n=44)	*≥55 yrs. old (n=20)*			
Ability	1.23	1.35	−.53		
Type of decision	1.70	1.30	.38		
Desire	2.52	1.90	.67*		
Luck	3.39	2.95	.38	.40*	67.2*
	<5 yrs. in position (n=14)	*≥5 yrs. in position (n=50)*			
Ability	1.50	1.20	.35		
Type of decision	1.93	1.48	.21		
Desire	3.00	2.14	.62**		
Luck	3.64	3.14	.40*	.42*	70.3**
	<10 yrs. with bank (n=25)	*≥10 yrs. with bank (n=38)*			
Ability	1.44	1.16	.75		
Type of decision	1.80	1.45	.60		
Desire	2.44	2.26	−.11		
Luck	3.32	3.21	.09	.30	65.1**
	Coalition was stable (n=49)	*Coalition changed (n=13)*			
Ability	1.33	1.00	.55		
Type of decision	1.67	1.31	.20		
Desire	2.47	1.85	.45*		
Luck	3.31	2.92	.38	.34	71.0**
	Board member (n=38)	*Bank officer (n=25)*			
Ability	1.23	1.32	.10		
Type of decision	1.62	1.52	−.55		
Desire	2.13	2.64	1.03*		
Luck	3.23	3.28	−.04	.29	59.4

[a]Entries are mean attributions for group members.

[b]Standardized discriminant coefficients. Significance indicates whether or not a particular attribution discriminated between subgroups.

[c]Canonical correlation coefficient for the discriminant function. Significance pertains to the correlation itself and not the redundancy coefficient.

[d]Values result from efforts to classify cases on the basis of the discriminant function. In all cases, the base rate for correct classification is 50%. Significance is tested by a chi-square test.

*$p < .05$

**$p < .01$

significant for only 8 out of the 24 attributions made by demographic subgroups, and in every case the strongest attributions were made to ability and the type of decision being made (stable attributions).

Further, in no case were the coefficients significant for ability or the type of decision made, indicating that subgroups did not differ in the way they

2
Dominant Coalitions and Various Subgroups

Nondominant Coalition Members (N=72)				
		Discriminant Analysis Results		
College Graduate (N=52)	*Nongraduate (N=20)*	*Standardized Coefficient*[b]	*Canonical Correlation*[c]	*% Correctly Classified*[d]
1.73	1.85	-.13		
2.00	1.95	.33		
2.65	2.60	-.07		
2.77	1.90	1.00**	.36*	66.7**
<55 yrs. old (n=42)	*≥55 yrs. old (n=30)*			
1.83	1.67	.38		
2.00	1.97	-.16		
2.86	2.33	.73**		
2.71	2.67	.57	.34	61.1
<5 yrs. in position (n=15)	*≥5 yrs. in position (n=55)*			
1.80	1.76	.15		
2.07	1.96	.44		
2.73	2.67	-.07		
2.87	2.44	1.01	.18	64.3
<10 yrs. with bank (n=32)	*≥10 yrs. with bank (n=38)*			
1.72	1.81	-.09		
2.00	2.03	.14		
2.84	2.53	.39		
3.00	2.18	.91**	.39*	68.6**
Coalition was stable (n=51)	*Coalition changed (n=11)*			
1.67	1.64	.03		
1.86	2.18	-.73		
2.78	2.18	.91		
2.57	2.45	.03	.33	64.5
Board member (n=35)	*Bank officer (n=37)*			
1.84	1.69	.38		
1.97	2.00	-.48		
2.81	2.46	.85		
2.43	2.63	-.46	.24	59.7

attributed dominant coalition membership to these factors. The differences that were indicated by the discriminant analysis are shown in Table 1. Note, however, that in each case, the resulting canonical correlation is significant, as is the percentage of cases correctly classified on the basis of the discriminant function. Thus, subgroup members did tend to make differential attributions overall, with these differences stemming almost totally from different perceptions of the importance of desire to be a member and luck.

In addition to testing hypotheses, a purpose of this study was the exploration of differences in attributions across different demographic subgroups. The results of these comparisons are presented in Table 2.

As seen in Table 2, within demographic subgroups there were differences in patterns of attributions. For example, coalition members under 55 made weaker attributions to desire than did nonmembers 55 or older. The same pattern was true for nonmembers as well. In addition, among the nonmembers, those who had a college degree tended to make stronger attributions to luck than did those without a college degree, but no such differences occurred among members. On the other hand, among coalition members, those who had been at their present jobs more than five years made stronger attributions to both desire and luck than did those with less tenure at their present jobs; those who saw the dominant coalition as stable made stronger attributions to desire; and board members made stronger attributions to desire than did bank officers. No differences among these groups were obtained for nonmembers.

Finally, it is noted that the present study reveals very little concerning the demograhic profile of a "typical" member of the dominant coalition. Coalition members in the present sample were more likely to be less than 55 years old than older (73 percent of members vs. 45 percent of nonmembers were under 55 years old), and they were more likely to be bank officers than board members (61 percent of members vs. 49 percent of nonmembers were officers). No other demographic variable (including education and years on the job) seemed to differentiate members from nonmembers.

Discussion

The present study represents an application of attribution theory to the study of the formation of coalitions within organizations. One major finding was that noncoalition members made stronger attributions (for membership) to the type of decision being made than had been expected. The pattern of results for the remaining three attributions, however, was consistent with predictions. This may indicate an awareness, by all respondent subgroups, that their firms' coalitions were formed specifically to get a job done and that this membership was a function of the decisions being made. Although such an awareness would be comforting to strategic decision makers, it also should be noted that noncoalition members felt about equally strongly that membership was due to nonperformance factors or luck, which executives might find particularly discomforting.

In general, the results point to a tendency, by all subsets of respondents, to attribute membership in the dominant coalition to stable factors. Such a view would cause a nonmember to believe that there was little reason to pursue membership in the face of steady resistance. Therefore, one might predict that a dominant coalition, once in power, would not face many efforts by outsiders to gain membership. Instead, one might expect that the emergence of competing, nonoverlapping coalitions would pose the major challenge, although further research is needed to substantiate this notion.

As for demographic variables, there were some differences in attributions made by members of different demographic subgroups, but no clear pattern emerged from these results. Thus it would seem that factors other than age, education, and such are the major determinants of attributions for success and failure. Whether similar life experiences, similar work experiences, or similar histories of success and failure are more important determinants is still open to speculation, but these all seem to be more reasonable factors than do demographic variables at this point.

Finally, it is noted how few factors emerged that differentiated members from nonmembers. Perhaps, then, the process of coalition formation is much more dependent on political factors than on personal factors. If the latter were the principal consideration, a more homogeneous breakdown of members and nonmembers would be expected. However, an examination of the pattern of attributions for coalition membership discloses that ability and the type of decision made seem to be viewed as the primary causes of coalition membership. This would indicate that coalitions are formed with very specific goals in mind and that coalition membership may be more a function of the role of the decision makers than of any stable characteristics of individuals. This conclusion seems to be consistent with the suggestion of Duncan (1976), but further research should be directed toward determining relationships between types of decisions and types of people who are part of the dominant coalition.

In conclusion, the results of the present study do provide some insight into participants' perceptions of coalition formation. These insights permit certain predictions about the dynamics of coalition formation, but subsequent research will be needed to validate these predictions. For the most part, participants would seem to attribute membership to the factors of ability, desire, and the nature of the decision made. Because coalition formation seems to depend on political more than on interpersonal interactions, the process might be viewed as one in which everyone recognizes the politics and knows how they work. The results suggest that, once a dominant coalition forms, its membership is perceived as stable and also that this process does not produce resentment among the "players." Orderly political maneuverings would seem more the rule than violent internal strife. At the present, however, such conclusions are only suggested by the results. The present study represents the first attempt to apply attribution theory to coalition formation within organizations.

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The Relationship Among Perceptual Similarity, Sex, and Performance Ratings in Manager-Subordinate Dyads[1]

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The relationship of perceptual similarity and sex in both manager and subordinate performance appraisals within manager-subordinate dyads was investigated. Perceptual similarity accounted for a sizable percentage of performance rating variance. Significantly lower performance appraisals were found in dyads in which there was mutual perceptual dissimilarity between managers and subordinates.

As part of his personality theory, Byrne (1971) proposed a social psychological model of interpersonal judgment that can be used to explain various aspects of organizational behavior. Specifically, Byrne proposed four classes of variables that affect interpersonal attraction and evaluation. Propinquity, the first class, is concerned with the physical and functional distance between two individuals. Research has shown that opportunity for interaction is an important factor affecting interpersonal attraction (Byrne & Buehler, 1955). Assuming the environment permits interpersonal interaction, the second class of variables affecting evaluation and attraction is the need for affiliation possessed by the individual (Byrne, 1962). The third class of variables, overt stimulus characteristics, involves the observable personal attributes of an individual that tend to elicit positive or negative reactions from others. Such variables as physical attractiveness, voice quality, skin color, and quality of clothing have been found to have a significant effect on interpersonal responses (Byrne & Wong, 1962). The last, and most important, class of variables is whether or not the elements of the relationship are perceived as being rewarding, punishing, or neutral.

[1]The authors would like to thank Benjamin Schneider and Arnon Reichers for their comments on an earlier draft of this paper. Correspondence should be addressed to Elaine D. Pulakos, Department of Psychology, Snyder Hall, Michigan State University, East Lansing, Michigan 48824.

A special case of this class of variables relates to the perception of similarity or dissimilarity among interacting persons.

A few studies have used portions of Byrne's model in examining organizational processes. It has been a consistent finding that a favorable evaluation of a job applicant is significantly related to the degree of similarity of that applicant to the rater. Golightly, Huffman, and Byrne (1972) reported that the proportion of similar attitudes held in common between a simulated loan officer and a bogus loan applicant influenced the attraction toward the applicant and the magnitude of the loan approval. Baskett (1973) found that attitudinally dissimilar applicants in a simulated employment interview were perceived as being less competent and were offered lower starting salaries. In another simulated interview study, Wexley and Nemeroff (1974) examined the influence of applicant race and biographical similarity on subjects' evaluations of job candidates. Although applicant race did not have a substantial impact on the evaluations, biographical similarity accounted for 12 percent of the interviewers' total decision variance. Rand and Wexley (1975), employing simulated videotaped employment interviews, also found that biographic similarity of interviewer and applicant led to substantially higher ratings of the candidate's job suitability. In fact, their "similar-to-me" effect accounted for 11.3 percent of the hiring recommendation variance. In the course of training experienced managers to minimize various rating errors, it was found that the similarity effect accounted for 26 percent of the variance in the ratings by control group managers (Latham, Wexley, & Pursell, 1975). Frank and Hackman (1975) examined the effects of interviewer-interviewee similarity on three college admissions officers' liking for and bias toward applicants. They found considerable individual variation in the effect of rater-ratee similarity across three interviewers. Due to these results, they questioned the generality of the proposition that similarity between interviewers and interviewees leads to favorable interviewer judgments.

Other studies have focused on the actual similarity between managers and their subordinates as related to managers' evaluations of subordinates' performance (Miles, 1964; Senger, 1971), subordinates' job satisfaction (Huber, 1970), and subordinates' evaluations of their managers (Weiss, 1977). In a recent field study, it was found that the magnitude of actual similarity (i.e., the difference between subordinates' work related self-description and their managers' work related self-description) was relatively weak as a predictor of satisfaction and performance appraisals compared to perceptual similarity (Wexley, Alexander, Greenawalt, & Couch, 1980). These results suggest that in work settings, actual similarity may not be as important to the process of manager-subordinate interpersonal relations as is *perceived* similarity of the other person.

Essentially all of the reviewed research studies on Byrne's similarity hypothesis have used undergraduate college students in simulated interview or work situations. Further, most researchers have concerned themselves with examining only actual or objective similarity and have ignored more potentially fruitful perceptual processes.

The purpose of the present research was to assess the impact of the similar-to-me effect on performance appraisals in a field setting. In a recent review of the performance appraisal literature, Landy and Farr (1980) noted that the similarity hypothesis has not been directly examined in a performance rating setting and that the similarity effect is clearly a fruitful area for performance rating work. Specifically, the present study examined the effects of perceptual similarity on both managerial and subordinate performance appraisals within manager-subordinate dyads. The research involved two of Byrne's classes of variables, namely, sex (i.e., an overt stimulus characteristic) and perception of another's overall similarity. Effects of rater and ratee sex were investigated by including in the design all four manager-subordinate sex combinations.

Method

Sample

The sample was comprised of 171 manager-subordinate dyads representing manufacturing ($N=17$), retailing ($N=12$), government ($N=21$), and service ($N=121$) organizations. The 121 service organizations included banks, hospitals, restaurants, and hotels. These data were gathered from organizations representing one eastern and three midwestern states.

The sample of managers included 102 females and 69 males, all of whom were chosen from approximately the same organizational level (i.e., first or second level supervision) in order to control for sources of unreliability due to raters from varying organizational levels (Borman, 1974). The managers had an average of 7.6 years of supervisory experience, 5.8 years in their present managerial jobs, and 1.7 years supervising their subordinate.

The entire sample of subordinates consisted of 90 females and 81 males. Of the females, 60 percent were between the ages of 18 and 29. This figure for males was 69 percent. The number of dyads in the four possible manager-subordinate sex combinations were as follows: female-female ($N=57$), female-male ($N=45$), male-male ($N=33$), and male-female ($N=36$).

Behavioral Observation Scales

Behavioral observation scales (BOS) for rating managers' leadership performance were developed from procedures adopted from Latham and Wexley (1981). These behaviorally based performance appraisal measures were constructed to assess the following four leadership factors proposed by Bowers and Seashore (1966):

1. Support. Behavior that enhances a subordinate's feeling of worth and importance.
2. Interaction facilitation. Behavior that facilitates developing close, mutually satisfying relationships within the group.

3. Goal emphasis. Behavior that stimulates enthusiasm within the work group for meeting goals and achieving excellent performance.
4. Work facilitation. Behavior that helps each subordinate achieve goal attainment by activities such as scheduling, coordinating, planning, and providing necessary resources and tools.

Initially collected were 225 critical incidents representing both effective and ineffective managerial behaviors. Of these incidents, 135 were modeled after items appearing on existing leadership questionnaires such as the LBDQ-XII (Stogdill, Goode, & Day, 1962) and the Survey of Organizations (Taylor & Bowers, 1974). The remaining incidents were obtained from interviews conducted with full time employees who were asked to identify various effective and ineffective behaviors exhibited by their managers.

A questionnaire containing the incidents then was administered to 40 employed students at Michigan State University. The students were asked to reclassify each incident to the one category that they felt best described it and to rate each incident on a 7-point scale, from 7, outstanding leadership performance, to 1, poor performance. Incidents were retained only if there was high interjudge agreement (i.e., standard deviation of 1.5 or less) and if their means were less than 3 or greater than 5. These procedures resulted in 124 critical incidents.

A revised questionnaire was sent to 25 managers, each with a minimum of 10 years of supervisory experience. They were asked to perform the same reclassifying and scaling procedures described above. Critical incidents were deleted that did not have reclassification percentages greater than 95 and standard deviations of less than .5. The final instrument contained 75 randomly ordered items (support = 23, work facilitation = 22, goal emphasis = 18, and interaction facilitation = 12). For each item, subordinates were asked to rate their managers on a scale that ranged from 0 to 4. The possible range of averaged scores for each of the four BOS measures was thus 0-4 and 0-16 for the total BOS score. Examples of two of the behavioral items follow:

Encourages workers to help each other on the job.

Almost Never	0	1	2	3	4	Almost Always

Speaks to me in a condescending tone of voice.

Almost Never	0	1	2	3	4	Almost Always

Procedure

Upper level managers at 20 organizations were contacted for permission to conduct the research in their firms. After permission was granted from 17 of these managers, a sample of first and/or second level supervisors, who agreed to participate in the research, were mailed a short biographical and attitudinal information form together with the Minnesota Satisfactoriness Scales (MSS) (Gibson, Weiss, Dawis, & Lofquist, 1970). This 28-item instrument contains five scales: performance, conformance, dependability, personal adjustment, and general satisfactoriness. The performance

scale concerns the subordinate's promotability and the quality and quantity of work. The conformance scale reflects how well the subordinate gets along with the supervisor and co-workers, as well as his or her observance of rules and regulations. The dependability scale assesses the frequency of disciplinary problems created by the subordinate. The personal adjustment scale concerns the subordinate's emotional health and well-being, and the general satisfactoriness scale is an overall global measure of performance across all 28 items. For each item, the manager was asked to check a 3-point scale. The possible range of averaged scores for performance, conformance, dependability, and personal adjustment was 1 to 3, and 1 to 12 for general satisfactoriness. Unobtrusively embedded in the biographical and attitudinal information form was a 5-point index of perceptual similarity, which read as follows:

My subordinate and I are similar kinds of people. (Check one)
__ Strongly Agree
__ Agree
__ Undecided
__ Disagree
__ Strongly Disagree

The managers were asked to complete the materials and return them by mail to the researchers. The result was a return rate of 98 percent. They were further requested to distribute a package of materials to their subordinate which contained the BOS and a biographical and attitudinal information form. This form also contained an index of perceptual similarity asking subordinates to indicate how similar they were to their managers. The materials instructed the subordinates to evaluate the manager as accurately and candidly as possible. They were asked to mail their completed forms to the researchers with the understanding that all data would be held in strict confidence. The return rate from subordinates was 93 percent. In summary, the MSS served as the dependent variables for the subordinates, and the BOS served as the dependent variables for the managers.

Results

The alpha coefficients for the BOS were as follows: support (.92), work facilitation (.90), goal emphasis (.88), interaction facilitation (.85), and total BOS (.97). The MSS alpha coefficients were: performance (.90), conformance (.88), dependability (.74), personal adjustment (.85), and general satisfactoriness (.93). The intercorrelations among the BOS and among the MSS are presented in Table 1.

The group of subordinates and group of managers were each trichotomized in the following manner: those responding "strongly agree" or "agree" on the index of perceptual similarity comprised the high similarity group, those responding "strongly disagree" or "disagree" comprised the dissimilar group, and those responding "undecided" were not included in the sample. Specifically, 115 dyads were excluded because their responses indicated that they simply "did not know" whether or not they were similar

Table 1
Intercorrelations Among Dependent Variables

Variable	*1*	*2*	*3*	*4*	*5*
1. Support					
2. Work facilitation	.77				
3. Goal emphasis	.65	.68			
4. Interaction facilitation	.70	.74	.75		
5. Total BOS	.88	.89	.87	.90	
1. Performance					
2. Conformance	.64				
3. Dependability	.57	.69			
4. Personal adjustment	.49	.60	.71		
5. General satisfactoriness	.82	.86	.87	.82	

to the other member of the dyad. It should be noted that by excluding this group, the reported omega square values were somewhat inflated (Maxwell, Camp, & Arvey, 1981).

Because the intercorrelations among the subscales of the BOS and among the subscales of the MSS were somewhat high, a multivariate technique that acknowledged high intercorrelations among the dependent variables was used. Multivariate analysis of variance (MANOVA) with a $2\times2\times2\times2$ factorial design was employed to measure the effects of manager perceived similarity of the subordinate (M SIM), subordinate perceived similarity of the manager (S SIM), manager sex (M SEX), and subordinate sex (S SEX) on the BOS and the MSS. The MANOVA results for the subordinates' BOS ratings of their managers' performance showed significant main effects for managers' perceived similarity (multivariate $F=7.93$, $df=4/152$, $p<.00001$) and subordinates' perceived similarity (multivariate $F=16.74$, $df=4/152$, $p<.00001$). That is, ratings given by subordinates who perceived themselves as similar to their managers were significantly different from those given by subordinates who perceived themselves as dissimilar. There also were significant differences in the BOS ratings of managers who reported being similar to their subordinate compared to those managers who reported being dissimilar to their subordinate. Moreover, the S SIM $\times$ M SIM interaction was significant (multivariate $F=3.95$, $df=4/152$, $p<.004$). In other words, there were significant differences in subordinates' BOS ratings of their managers attributable to the mutual (i.e., two-way) perceptual similarity or dissimilarity within the dyad. The MANOVA results for managers' MSS ratings of the subordinates' performance showed significant main effects for managers' perceived similarity (multivariate $F=12.64$, $df=4/152$, $p<.00001$) and subordinate sex (multivariate $F=3.89$, $df=4/152$, $p<.005$). Managers' ratings of subordinates whom they perceived as similar were significantly different from those given to subordinates perceived as dissimilar. Sex of the subordinate also produced differential ratings from the managers. Further, two significant interactions occurred with the MSS ratings: M SIM $\times$ M SEX (multivariate $F=4.46$, $df=4/152$, $p<.001$), M SIM $\times$ S SEX (multivariate $F=2.95$, $df=4/152$, $p<.05$).

Given the significant multivariate *F*-ratios on the BOS and MSS, subsequent univariate analyses were performed. Table 2 presents a summary of the significant main effects and interactions which resulted from the ANOVAs. Also presented in Table 2 are omega square values that were calculated for each of the significant effects (Hays, 1973). Omega square values for the total amount of variance accounted for by all similarity-sex effects also were computed for each BOS and MSS. The following percentages resulted on the BOS: support, $\omega^2 = .38$; work facilitation, $\omega^2 = .21$; goal emphasis, $\omega^2 = .20$; interaction facilitation, $\omega^2 = .17$; and BOS total, $\omega^2 = .29$. The variance accounted for on the MSS was $\omega^2 = .27$ for performance, $\omega^2 = .13$ for conformance, $\omega^2 = .14$ for dependability, $\omega^2 = .12$ for personal adjustment, and $\omega^2 = .21$ for general satisfactoriness.

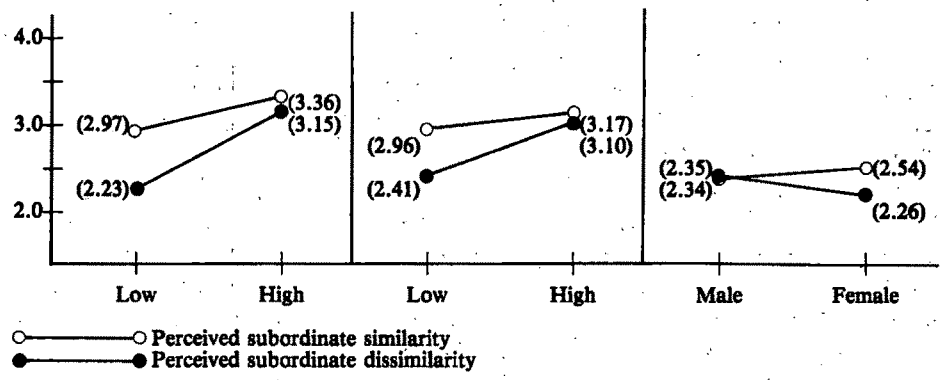
Results of the ANOVA on the BOS support and work facilitation scales indicate significant main effects for subordinates' perceived similarity and managers' perceived similarity. Most noteworthy, however, is the significant S SIM × M SIM interaction. Analysis of the mean data, presented in Figure 1, suggests that when subordinates feel that they are similar to

Table 2
Significant Effects from the Analysis of Variance on BOS & MSS

Effect	*df*	*F*	ω^2
Support			
S SIM	1	49.81***	.18
M SIM	1	25.95***	.09
S SIM × M SIM	1	9.23**	.03
Work facilitation			
S SIM	1	24.77***	.11
M SIM	1	12.00***	.05
S SIM × M SIM	1	6.77**	.03
Goal emphasis			
S SIM	1	32.63***	.15
Interaction facilitation			
S SIM	1	25.21***	.12
Total BOS			
S SIM	1	42.92***	.18
M SIM	1	10.89***	.04
Performance			
S SIM	1	4.14*	.02
M SIM	1	40.38***	.15
S SEX	1	4.50*	.01
Conformance			
M SIM	1	17.04***	.09
Dependability			
M SIM	1	21.93***	.11
S SIM × S SEX	1	4.39*	.02
Personal adjustment			
M SIM	1	25.21***	.12
S SIM	1	4.39**	.05
General satisfactoriness			
M SIM	1	31.36***	.15
S SIM	1	4.25*	.02

*$p < .05$
**$p < .01$
***$p < .001$

Figure 1
Mean Data for Significant Interaction Effects



their managers, they give uniformly high ratings on support and work facilitation regardless of the level of the manager's perceived similarity. However, when subordinates feel that they are dissimilar to their managers and the managers agree that they are dissimilar, the ratings on these scales are considerably lower. That is, when there is a state of mutual perceptual dissimilarity in the dyad, subordinate evaluations of their managers are the lowest of all conditions. In fact, Scheffé tests clearly revealed that the mutual dissimilarity mean was significantly lower than were the other three means on both support and work facilitation.

Main effects were found for subordinates' perceived similarity on goal emphasis and interaction facilitation. The ANOVA results for total BOS also showed significant main effects for both managers' and subordinates' perceived similarity. The interaction between these two variables also was found to be marginally significant ($F=15.49$, $df=1/155$, $p<.08$).

Concerning the ANOVAs for the MSS, there were consistent main effects for managers' perceived similarity on general satisfactoriness as well as for each of the subscales. There also were significant main effects for subordinates' perceived similarity on performance, personal adjustment, and general satisfactoriness. In each case, perceived similarity within the dyad resulted in significantly higher performance appraisals. There was an interesting main effect for subordinate sex on the performance scale, with females receiving higher ratings than males from both male and female managers. One significant interaction, S SIM × S SEX, resulted on the dependability scale. Inspection of the mean data for this interaction (see Figure 1) indicates that when subordinates perceived themselves as similar to their managers, the managers gave significantly higher dependability ratings to female than to male subordinates. However, when subordinates reported being dissimilar to their managers, managers rated both males and females uniformly lower.

Discussion

One of the major findings of the present research is that the similarity hypothesis, so often confirmed in laboratory and simulation studies, does indeed generalize to field settings. The similarity effect accounted for a sizable 11 percent to 18 percent of the variance in BOS ratings, and 5 percent to 15 percent in MSS ratings. These findings lend indirect support to Byrne's notion that perceptual similarity between people is rewarding because it satisfies their need for consensual validation. A further possible explanation for these results is that many individuals possess high occupational self-esteem, as reflected in typically high self-performance evaluations (Beatty, Schneier, & Beatty, 1977). It seems plausible that these individuals will evaluate more favorably others (i.e., managers and subordinates) whom they perceive as being similar to themselves.

Another finding of the research is the interaction between manager and subordinate perceptual similarity on subordinates' BOS appraisals of their managers' support and work facilitation. It can be speculated that when mutual perceptual dissimilarity ensues within a manager-subordinate relationship, managers substantially reduce the frequency with which they exhibit behaviors that enhance their subordinate's feelings of worth and that facilitate the subordinate's ability to achieve work goals. Based on an analysis of managers' and subordinates' answers to an open-ended question regarding the quality of their dyadic relationship, it is speculated that a weak vertical dyadic linkage (VDL) characterizes these particular sorts of dyads. Based on the work of Graen and his colleagues (Dansereau, Graen, & Haga, 1975; Graen & Ginsburgh, 1977), a strong linkage occurs when the manager accepts the subordinate into a consistent pattern of communication exchanges, whereas a weak linkage occurs when the manager fails to do so. Some managers are reluctant to provide their subordinates with support and work facilitation, and this could be especially true when the linkage is weak due to two-way perceptual dissimilarity. In fact, in one study Graen, Orris, and Johnson (1973) found the VDL to be so weak that managers at some point completely stopped giving relevant communication to their subordinates, who eventually resigned. It is interesting to point out that managers continue to provide support and work facilitation as long as at least one individual within the manager-subordinate dyad perceives similarity. Presumably, the VDL remains fairly high when the manager, the subordinate, or both parties believe that there is some degree of similarity between them.

It may not be particularly surprising that significant manager similarity × subordinate similarity interactions were not found for goal emphasis and interaction facilitation. After all, these BOS measures describe how managers deal with their entire work group rather than with any individual subordinate.

A possible limitation of this study is that a composite index of perceptual similarity was used rather than specific measures assessing various

attitudes, personality characteristics, emotional states, and so forth. However, it would have been totally infeasible to judge a priori the particular kinds of perceptual similarity that were most salient within each manager-subordinate dyad. Further, even if one were able to ascertain the kinds of perceptual similarity, the problem still would remain of diagnosing the specific components of similarity that are most important. Nevertheless, post-experimental interviews conducted with the subjects revealed that they were thinking primarily about work related factors when responding to the perceptual similarity index. The kinds of similarity mentioned most often were attitudes toward the organization and the work, approaches for dealing with difficult job problems, and beliefs about the proper ways of treating other people. It was noted that no one mentioned effectiveness of performance as a component of perceptual similarity.

By building on the social psychological findings of Byrne and others dealing with interpersonal attraction and evaluation, this study has shown that perceptual similarity certainly is related to managers' evaluations of their subordinates and subordinates' evaluations of their managers. Future research is now needed to determine (a) the characteristics of people who are most influenced by perceptual similarity in their ratings of others, (b) the specific kinds of perceptual similarity influencing their ratings, and (c) additional organizational consequences of mutual perceptual dissimilarity within manager-subordinate dyads.

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Modeling the Policies of Several Labor Arbitrators

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The policies of three labor arbitrators are modeled using seven criteria: management rights, contract language, past practice, fairness, effect on worker, negotiating history, and prior awards. The three arbitrators, apparently following the same overall policy, were found to be quite consistent in the application of their respective arbitral decision policy.

In a previous paper (Stahl & Cain, 1981), the present authors examined the possibility of using a linear model to capture the decision making policies of labor arbitrators. The criteria used were: efficiency (management rights), equity (fairness and effect on worker), and stability (clear language of the contract and past practice). An estimating equation was developed for the well known arbitrator, Saul Wallen, and the suggestion of Landis (1977) that Wallen does use a three-cue model to make an award was confirmed. The relatively high adjusted R^2 value of .72 indicated that Wallen was quite consistent in his policy.

A linear model was also derived, based on a set of group data consisting of 31 arbitration cases decided by 27 different arbitrators, published in a text by Schoen and Hilgert (1974). Previous policy capturing studies have indicated that individual decision makers are more consistent in the application of their individual policies than are groups of decision makers in the application of a group or average policy (Hoffman, 1960). The results (an adjusted R^2 of .32 and lower t-ratios on the individual beta weights as compared to the Wallen data) tended to confirm this finding.

A number of experts suggest, however, that there exists a considerable consensus among arbitrators regarding the importance of factors that enter a decision (Peterson, 1970; Prasow & Peters, 1970). Gross (1967), for instance, in his qualitative study in the subcontracting area, concluded that management rights (efficiency) is the dominant issue among arbitrators. In fact, one would expect labor arbitrators to exhibit an overall consistency in their decision making criteria, because in the long run they must remain acceptable to both management and the unions.

Policy-capturing models for three different arbitrators are developed in the present paper. The specific issue addressed is whether individual arbitrators differ in their policies.

Method

As in other policy capturing exercises (Beach, 1967; Dawes & Corrigan, 1974; Hoffman, 1960) the decision making criteria of the labor arbitrator are represented by the general linear model:

$$y_i = \sum_{j=1}^{k} \beta_j X_{ij} + \epsilon_i \qquad i = 1, 2, \ldots, n$$

where y_i = the decision of the arbitrator in the ith case
β_j = the beta weight or importance attributed to information cue X_{ij}
X_{ij} = the information cues used by the arbitrator
ϵ_i = the unexplained component in the decision making process which we assume is a normally distributed random variable

The proper choice of cues is very important in a policy capturing study. If a set of cues selected is different from the ones used by the decision maker, a very weak model results. If the cues selected are actually used by the decision maker, but he uses them in an inconsistent manner, a weak model again will result. Such a problem can be viewed as a model with random coefficients, which introduces heteroscedasticity into the terms and results in the estimated beta weights ceasing to be those with minimum variance (Theil, 1971).

Landis (1977) argued that the arbitrator Saul Wallen used three criteria to reach a decision. Other studies have mentioned several additional criteria (Dworkin, 1974; Fossum, 1979; Gross, 1967; Harris, 1966; Jennings & Martin, 1978; Peterson, 1970; Prasow & Peters, 1970). In this paper the following seven cues are presented:

1. management rights and efficiency
2. clear language of the contract
3. past practice
4. fairness
5. effect on the worker
6. negotiating history
7. prior awards

The data were compiled using published cases extracted from the *Labor Arbitration Reports* (1973-1980) and the Commerce Clearing House *Labor Arbitration Awards* (1977-1980). Three arbitrators were selected according to certain criteria. First, the arbitrator had to have published at least 30 cases so that a reasonable sample size could be obtained. Second, any arbitrator whose published cases were almost exclusively for one company

was eliminated. This could bias the hypothesis being tested by introducing a new element in the overall environment; namely, the relative strength of management and labor in specifying a permanent arbitrator. Third, cases were limited to grievance issues (company vs. union); hence interest arbitration (cases to decide contract language) and jurisdictional disputes (union vs. union) were deleted. Fourth, if a case involved the arbitrability of a grievance, the case was scored on the grievance alone when the arbitrator decided the case was arbitrable. Otherwise, the case was eliminated. Last, arbitrators with the most recent published cases were chosen so that the results would represent current policies.

The 30 most recent cases from each of the following arbitrators were selected: Charles F. Ipavec (1977-1979), John F. Sembower (1976-1979), and Ralph Roger Williams (1970-1979). The case sets span a considerable array of issues as categorized in Table 1, with the exception of subcontracting, which is present only twice. Each of the arbitrators has a similar number of cases in each of the three major categories: cases involving some kind of discipline, cases involving structural issues (but normally not discipline), and cases involving pay.

Table 1
Categories of Case Types

Case Type	*Arbitrator*		
	Ipavec	*Sembower*	*Williams*
1. Discharge, discipline, work rules, working conditions, job safety, insubordination	12	11	11
2. Structural issues: job classification, work schedules, seniority, hiring, transfers, vacancies, insurance benefits	7	9	9
3. Pay: rates of pay, holiday pay, vacation pay, severance pay, overtime pay	7	8	7
4. Subcontracting	1	1	0
5. Other	3	1	3

The cases were transformed from their narrative format to numerical format for data analysis by reading the cases and then scoring the cues and the awards. If a cue was not present, it was given a rating of zero. If a cue was strongly in favor of management or of the union, it was given a score of $+2$ or -2 respectively. A cue moderately in management's favor was scored as $+1$, and a cue moderately in favor of the union was scored as -1. It should be noted that scoring the cases that were written by the arbitrators assumes that it is the arbitrator's "perception" of the facts that determines the decision, not some "objective" recording of the facts. In many cases management and the union will submit briefs that contain two different versions of the "facts." The arbitrator himself determines which "facts" are relevant, and in the model presented here it is assumed that he categorizes these "facts" into the relevant cases and, given the relative importance he attaches to each cue (i.e., the magnitude of the beta weights), he renders a decision. Because an arbitrator must remain acceptable to both

labor and management over the long run in order to remain in the arbitration business, it is quite possible that the published opinions of the arbitrator will conceal his true criteria. It is assumed that this is not serious. If, however, it is serious, then the adjusted R^2 will be lowered, and it could introduce specification bias. The awards, the values of the dependent variable, were scored +1 for a management win, −1 for a union win, and zero for a split decision.

The actual scoring was done by a graduate student who was specially trained in the area of labor arbitration. As a consistency check, one of the co-authors also read and scored the set of cases. The correlation between

Table 2
Correlation Between Scoring of the Student and the Co-Author

Cue	*Arbitrator*		
	Ipavec	*Sembower*	*Williams*
Management rights	.72	.89	.88
Contract language	.88	.93	.93
Past practice	.60	.87	.54
Fairness	.86	.90	.87
Effect on worker	.68	.68	.80
Negotiating history	.81	1.00	1.00
Prior award	1.00[a]	.71	.66

[a]Both scorers agreed that Ipavec did not use the cue "prior award."

the graduate student's scoring and the co-author's is given in Table 2. By far the easiest arbitrator to score was Sembower, and the two scores are most in agreement (relatively higher correlation across the seven cues) in his cases. Sembower tended to be "legalistic" in his decision making, often citing legal precedents and quoting various legal doctrines. He also was very precise in describing the rationale for his decision. Identifying and scoring the seven cues usually was not difficult in his case. The overall consistency between the scorers was fairly good with the exception of "past practice" for Ipavec and Williams, whose correlations were .60 and .54, respectively, and "effect on worker," whose correlations were .68 for both Ipavec and Sembower.

When the scorer reads the cases he is aware of the decision prior to his scoring of the cues. This is inevitable because the arbitrator in his published opinion is in fact describing the rationale for his decision. It could be argued that this leads to a consistency bias that predetermines the results. Consequently, one cannot be sure whether the "facts" determine the "results" or vice versa. The scorer, however, is only attempting to categorize and quantify the actual cues that the arbitrator uses. For example, suppose the decision is in favor of management and the contract contains a strong management rights clause. If the arbitrator does not mention this clause or states that it is not relevant to the current case, the cue, "management rights," is scored as zero. For any cue to be scored in favor of either the management or the union, the arbitrator in his written decision must

specifically bring up the cue in a recognizable form and discuss it. As a result of this scoring procedure, the linear model cannot be used to predict decisions of a case that contains only a set of hypothetical "facts." The reason for this is that one needs a method of predicting how a particular arbitrator would partition the "facts" into the relevant cues. Given this partition, the model could be used for prediction.

The basis for this research is the Brunswik's Lens model as described by Beach (1967), Brown (1972), and others. The model is not intended to be used for prediction but for explaining the decision processes of the decision maker.

Results

A separate regression was estimated for each arbitrator, and the results are contained in Table 3. The overall result indicates that each arbitrator was highly internally consistent in the application of his individual decision policy: the adjusted R^2 ranging from .92 for Ipavec through .86 for Williams and the overall F ratio ranging from 28.3 to 59.3. All seven cues in the Sembower model are significantly different from zero at the .05 level with the exception of "prior awards," which is significant at the .10 level. Six of the cues are significantly different from zero in the Ipavec model (the cue "prior award" was not present in the scoring). In the Williams model only the cues "contract language" and "fairness" were significantly different from zero.

Table 3
Seven-Cue Model of Labor Arbitrators' Decision Making[a]

Cue	*Arbitrator*		
	Ipavec	*Sembower*	*Williams*
Management rights	.193	.283	.232
	(3.38)	(3.31)	(1.56)
Contract language	.380	.227	.38
	(9.34)	(3.99)	(7.28)
Past practice	.342	.27	.259
	(3.34)	(2.36)	(1.04)
Fairness	.209	.295	.246
	(4.52)	(4.79)	(3.08)
Effect on the worker	.182	.271	.063
	(2.79)	(3.21)	(.42)
Negotiating history	.213	.388	.165
	(3.29)	(3.17)	(.91)
Prior awards[b]		.16	.271
		(1.85)	(1.28)
Intercept	−.13	−.07	−.18
R^2	.94	.91	.90
Adjusted R^2	.92	.88	.86
Overall F	59.3	34.2	28.3
Number of observations	30	32	31

[a]Format: Estimated regression coefficient (t-ratio). All t values > 2.04 imply a significance level of .95. All t values > 2.75 imply a significance level of .99.
[b]Cue not present in the Ipavec scoring.

At first glance the beta weights for each arbitrator appear to be of the same order of magnitude. Several hypotheses concerning this conjecture were tested. For the Sembower equation none of the seven cues could be established as being statistically significantly different from each other. In the Ipavec model the cue "contract language" is statistically larger than all of the other cues with the exception of "past practice" and "negotiating history." After re-estimating the Williams model with only the cues "contract language" and "fairness" present, the beta weights were found to be the same statistically.

In a previous paper the authors developed a three-cue model for the arbitrator Saul Wallen (an idea originally suggested by Landis, 1977). A three-cue model for Ipavec, Sembower, and Williams also was developed. The cues are defined as:

1. Management rights
2. Equity = fairness + effect on worker
3. Stability = contract language + past practice + negotiating history + prior awards

The results are contained in Table 4. The relatively high adjusted R^2 and overall F values indicate that the three-cue model does quite well in representing an arbitrator's policy. In fact the cue "stability" in these regressions presents a picture similar to the earlier analysis of Saul Wallen (Stahl & Cain, 1981).

The apparent similarity of the magnitude of the beta weights in the three-cue model across the three equations raises the question of whether the three arbitrators are in fact following different policies. To test this, a Chow test was used. The beta weights in the three-cue model were not statistically different across the arbitrators. Unlike many other policy capturing studies, it was found that the three arbitrators apparently are using the same decision making criteria.

Table 4
Three-Cue Model of Labor Arbitrators[a]

Cue	Arbitrator		
	Ipavec	*Sembower*	*Williams*
Management rights	.211	.288	.327
	(3.70)	(3.59)	(3.17)
Equity[b]	.277	.268	.182
	(5.96)	(7.30)	(4.01)
Stability[c]	.323	.239	.351
	(11.67)	(8.16)	(8.85)
Intercept	−.11	−.12	−.22
R^2	.93	.90	.89
Adjusted R^2	.92	.89	.88
Overall F	112.9	84.5	71.7
Number of observations	30	32	31

[a]Format: Estimated regression coefficient (t-ratio). All t values > 2.04 imply a significance level of .95. All t values > 2.75 imply a significance level of .99.
[b]Equity = fairness and effect on worker.
[c]Stability = contract language + past practice + negotiating history + prior awards.

Table 5
Amount of Correlation of Predicted and Actual Values (7-Cue Model)[a]

	Model 1	*Model 2*	*Model 3*
Award 1	.97	.94	.96
Award 2	.92	.95	.92
Award 3	.94	.91	.95

[a]The number on the diagonals is the correlation between the predicted values and actual decisions for each regression model. Ipavec is 1, Sembower is 2, and Williams is 3.

To test this idea further, the estimated coefficients from arbitrator 1 (seven-cue model) were used to predict the decisions of arbitrators 2 and 3 and vice versa. For example, the estimated coefficents in the Ipavec regression as calculated in Table 3 and Sembower's cue values were used to predict Sembower's awards. The new predicted values of Sembower's awards were correlated with his actual awards. This correlation was calculated as .92. This experiment was done for all the arbitrators' awards and all three models. The results are contained in Table 5. These correlations are so high that it must be concluded that the arbitrators are following the same policy.

The data then were pooled, and a common regression equation was estimated for the three arbitrators. Using the common beta weights, the awards were predicted for each arbitrator and were classified as a management win for all predicted values $\geq .5$, a union win for all predicted values $\leq -.5$, and a split decision for all values greater than $-.5$ but less than $+.5$. Of the 93 arbitration cases, 89 were classified correctly, for an accuracy of 95.7 percent overall.

Discussion and Conclusions

Overall this research is consistent with the view that labor arbitrators possess the same cue weights and are pursuing essentially the same policies. This is consistent with the hypotheses of Peterson (1970) and Prasow and Peters (1970).

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The Relationship of Organization Structure and Interpersonal Attitudes to Role Conflict and Ambiguity in Different Work Environments[1]

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Role conflict and role ambiguity were investigated in relation to structural and interpersonal variables. Role conflict was not related to either structural or interpersonal variables in a production/manufacturing environment, and to only interpersonal variables in a research and development environment. Role ambiguity was related to structural variables regardless of work environment.

A substantial body of empirical research on role stress has shown that high levels of role conflict and role ambiguity result in unfavorable outcomes for both the individual and the organization (House & Rizzo, 1972; Kahn, Wolfe, Quinn, Snoeck, & Rosenthal, 1964; Miles, 1975, 1976a, Miles & Perreault, 1976; Morris, Steers, & Koch, 1979; Rizzo, House, & Lirtzman, 1970; Schuler, 1977; Tosi, 1971). One area in which research has been lacking, however, has been on understanding the nature of role stress in different kinds of organizational environments. Although recent studies have investigated the effects of both organization structure (e.g., formalization, participation in decision making, and span of subordination) and interpersonal variables (e.g., trust, liking, and respect) on role stress, they have limited their samples to homogeneous work environments (Hamner & Tosi, 1974; Miles, 1976b; Moch, Bartunek, & Brass, 1979; Morris et al., 1979; Rogers & Molnar, 1976). These investigations of role stress in homogeneous work environments have provided extremely valuable empirical

[1]The authors wish to thank Loretta C. Schnare for her research assistance on this study.

evidence on how a host of variables, both structural and interpersonal, interact to influence experienced role conflict and ambiguity. However, this does not allow for generalizations across organizations in different work environments and having differing technologies. Current research also has not examined whether both structural and interpersonal variables may have a differential impact on role conflict and ambiguity. The purpose of this study is to examine the differences in relationship between organizational structure and interpersonal variables with role conflict and role ambiguity in two different work environments.

Theoretical Framework

Contingency organization theorists have shown that organizations faced with uncertain environments characterized by rapid rates of scientific and technological change (e.g., petrochemical, electronic, and pharmaceutical firms) tend to have an organization structure that is less formalized (Burns & Stalker, 1961; Lawrence & Lorsch, 1967). The interpersonal orientations of these firms also show strong tendencies to be less task and more relationship oriented. It can be argued that in such organizations the degree of role conflict experienced by employees would be more strongly related to interpersonal variables (i.e., the degree of trust, respect, and liking they have for their co-workers) than to structural variables.

Lawrence and Lorsch (1967) also have shown that in manufacturing firms that are generally characterized by little innovation and established routinization (e.g., containers, textiles, and assembly type firms), there tends to be greater formalization of the organization structure. As a result, greater emphasis is placed on task accomplishment. In such firms, one would expect that the degree of role conflict experienced by employees would be associated more to structural variables (i.e., formalization, participation in decision making, and span of subordination).

Role conflict, by definition, involves an incompatibility between job tasks, resources, rules or policies, and other people. Conversely, role ambiguity encompasses a lack of information about the job role for the individual with regard to uncertainty between role requirements and self. Because role ambiguity encompasses uncertainty about role requirements (frequently defined directly by job descriptions or organizational rules and procedures, as opposed to role conflict which involves direct interaction with others), it is argued here that role ambiguity will show little relationship to interpersonal variables. However, a strong association should be expected between role ambiguity and structural variables because the uncertainty experienced results from a lack of information concerning an organization role that can be defined only by that organization's structure (e.g., the nature of job rules and procedures, the degree of participation in decision making, and the span of subordination).

From this discussion, the following hypotheses can be stated:

Hypothesis 1. In organizations in which the work environment is organized in a very formalized and structured manner, the degree of role conflict experienced will be related to structural variables and will show no relationship to interpersonal variables.

Hypothesis 2. In organizations in which the work environment is organized in an informal and unstructured manner, the degree of role conflict experienced will be related to interpersonal variables and will show no relationship to structural variables.

Hypothesis 3. Regardless of the type of work environment, role ambiguity will be related to structural variables and will show no relationship to interpersonal variables.

Method

Sample and Research Site

Subjects were obtained from two different work environments. One was a department of a large public utility involved in data processing research and development. The other was a production department of a manufacturing organization with a true assembly line operation. Subjects in both samples were supervisory personnel ranging from first line to senior supervisory levels. A total of 42 supervisors participated, 21 from each work environment. The effective participation rate was 100 percent. Questionnaires were administered to these supervisors at their work sites. They were completed by the subjects during their own free time. It was stressed that questionnaire responses were confidential, anonymity of respondents was guaranteed, and participation was completely voluntary.

Measures

Role Stress

Both role conflict and role ambiguity were measured with scales developed by Rizzo et al. (1970). These scales were selected based on previous evidence of their factorial independence and their extensive use in other studies. Cronbach's coefficient alpha was used to estimate the reliability of the measures (Nunnally, 1967). For role conflict $\alpha = .84$, and for role ambiguity $\alpha = .84$.

Organizational Structure

Formalization was defined as the importance of rules and procedures. Formalization was measured by a 15-item scale developed by Hage and Aiken (1969); reliability ($\alpha = .63$).

Participation in decision making was measured by a 4-item scale used by Vroom (1960). The items measured the amount of influence the supervisor had on the decisions made in the organization ($\alpha = .52$).

Span of subordination measured the extent to which the respondent was exposed to multiple authority with regard to the initiation of his or her work. The instrument required respondents to select from one to five categories, ranging from one to five persons, which best indicated the number of different individuals who typically assigned work to the respondent (Morris et al., 1979).

Interpersonal Attitudes

The scales used to measure the interpersonal variables of trust, respect, and liking were developed by Kahn et al. (1964). Each respondent was asked to think of up to five individuals who could substantially help or hinder his or her job performance. Next, the individual was required to rate these people as to how much trust, respect, and liking the individual had for each. A 5-point scale was used, ranging from "to a very great degree" to "not at all."

A separate page was included with the questionnaire on which this list of names could be recorded and then detached and destroyed by the respondent. The reliabilities for these measures were, trust ($\alpha = .40$), respect ($\alpha = .63$), and liking ($\alpha = .66$). With the exception of trust, all the reliability coefficients were above .50, which is acceptable for research of this nature (Nunnally, 1967).

Results

The means and standard deviations by type of work environment and the intercorrelations of all the variables for both samples combined showed that the three structural variables were not correlated significantly. (The table of means, standard deviations and intercorrelations can be obtained from the authors.) However, participation did correlate significantly with all the interpersonal variables.

This indicates that the structural and interpersonal variables measured in the study may not be clearly independent. In contrast, the interpersonal variables of trust, respect, and liking were significantly intercorrelated but were not correlated with formalization of span of subordination.

The means and standard deviations by type of work environment also show initial support for some of the theoretical assumptions made earlier. For the production sample all three structural variables were rated as slightly higher than were those in the research firm. Also, role ambiguity was rated as higher in the research sample than in the production sample, as would be expected.

Table 1 shows the correlation coefficients of the relationships between role conflict and role ambiguity and the structural and interpersonal variables in each type of work environment. Role conflict in the production sample was only significantly related negatively to formalization but not with participation or span of subordination. As predicted in Hypothesis 1, role

Table 1
Pearson Correlation Coefficients Between Role Conflict, Role Ambiguity and Structural and Interpersonal Variables in both Production and Research Work Environments[a]

Variables	*Role Conflict*[b]		*Role Ambiguity*[b]	
	Production Sample	*Research Sample*	*Production Sample*	*Research Sample*
Structural				
Formalization	-.58**	-.23	-.61**†	-.38
Participation	-.38	-.24	-.60**†	-.38
Span of subordination	.13	.52*	.07	.48*
Interpersonal				
Trust	-.33	-.37	-.37	-.18
Respect	-.31	-.58**	-.34	-.29
Liking	-.09	-.53*	-.01†	-.27

[a]Correlations computed were based on varying N of 21 to 20.
[b]Analysis using the more common 14-item scale (role conflict = 8 items, role ambiguity = 6 items) gave the same pattern of results for the significance of the correlations. Reliabilities of both scales showed only a slight improvement over the 30-item scale (role conflict = .86, role ambiguity = .88).
†Significant difference between high and low correlation coefficients in column (one-tailed test, $p < .05$).
*$p < .05$
**$p < .01$

conflict showed no significant relationship to interpersonal variables. This shows only weak support for Hypothesis 1. For the research sample, role conflict showed a significant negative relationship to the interpersonal variables of respect and liking but not to trust. With the exception of span of subordination, role conflict had no significant relationship to the two other structural variables. This shows some support for Hypothesis 2.

Role ambiguity was significantly correlated with the first two structural variables (formalization and participation) in the production sample and with the third structural variable (span of subordination) in the research sample. As predicted in Hypothesis 3, role ambiguity showed no significant relationship to interpersonal variables in both work environments. In examining the differences between the correlations in the two samples, only the extreme differences among the correlations were significant. In the production sample the correlations between role ambiguity and formalization and between role ambiguity and participation were significantly higher than the correlation with liking, $t(18) = 2.09$, $p < .05$ (one-tailed) and $t(18) = 2.05$, $p < .05$ (one-tailed). The results indicate some support for Hypothesis 3.

Significant correlations between role ambiguity and role conflict ($r = .85$, $p < .001$, in production and $r = .74$, $p < .001$ in research) suggest that each should be partialled out of relationships between the other and the structural and interpersonal variables. Results of the partial correlation analysis are shown in Table 2. The correlation between formalization and role conflict in the production sample is spurious. This shows that there is no support for Hypothesis 1. However, the partial correlation analysis strengthens the support for Hypothesis 2. For the research sample none of the

Table 2
Partial Correlation Coefficients Between Role Conflict, Role Ambiguity, and the Structural and Interpersonal Variables

Variables	Role Conflict[a]		Role Ambiguity[b]	
	Production Sample (N=21)	Research Sample (N=21)	Production Sample (N=21)	Research Sample (N=21)
Structural				
Formalization	−.13	.08	−.28	−.32
Participation	.32	.07†	−.58**†	−.31
Span of subordination	.14	.29	−.08	.16
Interpersonal				
Trust	−.04	−.35	−.17	.14
Respect	−.04	−.57**†	−.16	.26
Liking	−.15	−.52*	.11†	.22

[a]1st order partials controlling for role ambiguity.
[b]1st order partials controlling for role conflict.
†Significant difference between high and low correlation coefficients (one-tailed test, $p<.05$).
*$p<.05$
**$p<.01$

correlations between role conflict and the structural variables was significant. The correlations between role conflict and the two interpersonal variables of respect and liking remain significant as predicted. Support for Hypothesis 3 is diminished in the partial correlation analysis; role ambiguity is related to participation only in the production sample. Again, in examining the significant differences between the correlations, only the extreme differences were significant. For the research sample the correlation between role conflict and respect was higher than was the correlation between role conflict and participation, $t(18)=1.74$, $p<.05$ (one-tailed), and the correlation between role ambiguity and participation was significantly higher than was the correlation between role ambiguity and trust, $t(18)=1.66$, $p<.05$ (one-tailed).

Discussion

Although these findings show some support for two of the three a priori hypotheses presented earlier, several limitations of this research should be recognized. One of the major limitations of this study is the small sample size. This may have resulted in a greater chance for statistical estimation errors of the variables. However, because the samples were relatively small, only if the predicted differences in the correlations were extremely large would the results show strong support for the hypotheses. As shown in the results section, only some of these extreme differences were significant. The research also was meant to indicate the relative importance of the structural and interpersonal variables in their relationship to role conflict and role ambiguity and not to suggest any directional causality. Clearly the question of causality can be answered only with further research.

The study also makes an assumption that the structural and interpersonal variables are independent. Some of the intercorrelations discussed in the results section place some doubt on this assumption. Another problem could be that the correlations were spurious because the data were obtained from one source. However, this common method variance may have made it more difficult to detect the differences in correlations to support the hypotheses further. Both these problems may have weakened rather than biased the results toward supporting the hypotheses.

A confounding effect could be that the differences observed between the two different work environments were due to organizational and not subunit differences. With the present data this explanation cannot be ruled out. However, it could be argued that such differences, if strong, would have shown up in the role ambiguity results; it was hypothesized that there would be no differences in the results for both work environments.

With the above limitations in mind it could be suggested that when one seeks to understand and determine what may influence role stress in an organization, it is not enough simply to consider the impact of both structural and interpersonal variables on role conflict and ambiguity. This research has shown that the nature of the work environment (i.e., whether it be manufacturing/production or research and development) may be a significant factor in determining whether structural or interpersonal variables may be more important in influencing role stress. As a caveat, any normative managerial implications should not be inferred at this time. Further research using larger sample sizes, a greater variety of work environments, and the inclusion of other different contextual variables needs to be carried out. This may eventually lead to a better understanding of the antecedents of role stress.

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Interdependence and Coordination in Organizations: A Role-System Analysis[1]

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The relations between interdependence and coordination in organizations are investigated. Results from a study of 127 work units in 33 organizations indicate that as the level of interdependence increases, the level of coordination and the impact of coordination on unit output also increase.

Basic to the system paradigm of organization is the premise of interdependence among component elements. Although many authors (Thompson, 1967; Weick, 1974, 1976) have theorized about the implications of interdependence for organizational functioning, research in this area has been limited. To date, only three major empirical studies have investigated interdependence in relation to other organizational variables (Mohr, 1971; Pennings, 1975; Van de Ven, Delbecq, & Koenig, 1976). Some of Van de Ven et al.'s findings were replicated by Tushman (1978). The present study attempts to develop this area of inquiry further by examining the link between interdependence and coordination based on a role-system perspective (Katz & Kahn, 1978). Specifically, the study investigates the implications of interdependence for (1) coordination as a requisite for organizational functioning and (2) the impact of coordination on organizational performance. This investigation complements the earlier study by Van de Ven et al. (1976) on the relations between interdependence and the use of coordinating mechanisms.

For the purposes of this investigation, interdependence is defined as the extent to which the organization's task requires its members to work with one another (Mohr, 1971; Thompson, 1967). In role-system terms, interdependence represents the extent of dependency between the performances of work roles. Coordination is defined as the extent to which the work activities of organizational members are logically consistent and coherent (Georgopoulos & Mann, 1962; Lawrence & Lorsch, 1967). In role-system terms, coordination represents how well the organizational members as a

[1]An earlier version of this paper was presented at the 1981 Southern Management Association meeting, Atlanta. The author expresses his appreciation to three anonymous reviewers for their helpful comments.

whole perform in accordance with their roles in the system. In the following analysis, the role-system conceptualizations of interdependence and coordination are used as a basis for developing a theoretical link between the two concepts.

Theoretical Analysis and Hypotheses

From a role-system perspective, human organizations are contrived in nature and exist only as sets of work roles (Katz & Kahn, 1978). These work roles, each carrying certain information or qualifications, supplement and/or complement one another and together form a meaningful configuration. Thus, in order for an organization to exist and remain viable, its members must not act in whatever ways they choose. Instead, they must perform in accordance with their roles in the system. This means that an organization must achieve coordination among its members if it is to function as a system at some level of effectiveness. More specifically, an organization must attain a certain requisite level of coordination in order to function (Lawrence & Lorsch, 1967), and its system performance will be enhanced as additional coordination is attained beyond the requisite level.

The requisite level of coordination for organizational functioning varies with the organization's level of interdependence. In low interdependence organizations, the performance of any one work role is relatively independent of the performances of other work roles, and each work role renders a discrete unqualified contribution to the system whole. Thus, low interdependence organizations will be able to function as long as some organizational members perform in accordance with their roles in the system. On the other hand, in high interdependence organizations, no one work role can be performed unless all or most work roles are carried out properly, and each work role has to be combined with other work roles in order to have meaning for the whole system. Thus, high interdependence organizations will not be able to function unless all or most organizational members perform in accordance with their roles in the system. Because the level of coordination represents how well the organizational members as a whole perform in accordance with their roles in the system, the requisite level of coordination for organizational functioning will be higher for high interdependence organizations than for low interdependence organizations. Hence, the higher the level of interdependence, the higher the level of coordination an organization has to attain in order to function. Accordingly, it is hypothesized that *a positive relationship exists between level of interdependence and level of coordination* (Hypothesis 1).

The impact of coordination on organizational performance also varies with the organization's level of interdependence. According to system theory (Bertalanffy, 1968), low interdependence systems are governed by a "summative" composition rule, that is, the whole is an additive or pooled outcome of its parts. An example would be a typing pool with each typist working on a chapter of a book manuscript. The system outcome represents a *summation* of the members' individual contributions. On the other hand,

high interdependence systems are governed by a "constitutive" composition rule, that is, the whole is a "superadditive" (Miller, 1965) or joint outcome of its parts. An example would be three persons in a boat, with one serving as a helmsman and the others as rowers. The system outcome represents a *union* of the members' individual contributions. Thus, in low interdependence organizations, the impact of coordination on organizational performance will be an additive effect of organizational members' role performances. In high interdependence organizations, the impact of coordination on organizational performance will be a superadditive effect of organizational members' role performances. According to Miller (1965), a superadditive outcome is larger than an additive one—which can be shown mathematically. Thus, the impact of coordination on organizational performance will be larger in high interdependence organizations than in low interdependence organizations. Accordingly, it is hypothesized that *the relationship between coordination and organizational performance will become stronger as the level of interdependence increases* (Hypothesis 2).

Method

Sample

The study sample consisted of 127 research units sampled from 33 organizations in Belgium. Of these organizations, 15 were academic institutions, 12 were private industrial enterprises, and 6 were government agencies. Each research unit consisted of a unit head, staff researchers, and technical support personnel. There were averages of 7.9 staff researchers and 3.5 technical support personnel per unit. (A detailed description of the sampling procedures is available in Andrews, 1979.)

Data Collection

The data were collected using a combination of personal interviews (with unit heads), on-site administration of questionnaires (to staff researchers in the unit), and organizational records (for information on research output). In addition, standardized evaluation forms were mailed to external evaluators who were asked to assess the work of the research units with which they were familiar. The external evaluators were all recognized professionals—scientists, engineers, and research administrators—in their fields. Their names and addresses were gleaned from a number of different professional sources (e.g., journal editorial boards), including lists provided by the unit members themselves. An average of 3.2 external evaluators per unit was included.

Measures

Interdependence was measured with a modified version of Mohr's (1971) scale. This scale has shown adequate construct validity, according to Van

de Ven et al. (1976). Unit heads were asked to indicate the extent to which the nature of the research work in their unit required its members to work closely with one another (as opposed to working individually).

Coordination was measured with a modified version of Georgopoulos and Mann's (1962) scale. This scale has shown high reliability and validity (Georgopoulos & Mann, 1962; Price, 1972). Staff researchers were asked to indicate the extent to which (1) the research program of the unit was *coherent* (as opposed to fragmented) and (2) the research planning in the unit was *well conceived*. A composite index was formed by averaging respondents' scores across items. The alpha coefficient of the index was .81, with an interitem correlation of .69.

Unit performance was assessed in terms of the quality and quantity of the unit's research output. Output quality was measured with items developed by Pelz and Andrews (1966) for the assessment of research effectiveness. Unit heads and external evaluators were asked to evaluate the extent to which the unit had been (1) innovative in generating *new* knowledge or methods, (2) productive in *adding* knowledge or methods, and (3) had contributed to scientific or technical development in its field. Following Hage and Aiken's (1967) procedure, equal weights were assigned to responses of the unit heads and external evaluators. A composite index was constructed by averaging respondents' scores across items. The alpha coefficient of the index was .87.

Output quantity was measured in terms of the number of journal articles the unit had published over the past three years. Following Pelz and Andrews' (1966) procedure, the raw output quantity scores were converted to lognormal scores. The mean score for the total sample was 2.45, with a standard deviation of 1.44. On average, the academic research units published more articles ($\overline{X} = 2.68$) than did the governmental and industrial research units ($\overline{X} = 1.09$). The latter group, however, did not differ significantly from the least publishing group of academic research units (law: $\overline{X} = 1.01$). This finding suggests that there is not an extreme discontinuity between the publishing activity of academic and nonacademic research units, implying that number of journal articles is an important output component in both cases.

The measures used for testing the interdependence-coordination and coordination-output quality/quantity relationships were based on different, independent data sources (namely, unit heads for interdependence, staff researchers for coordination, unit heads and external evaluators for output quality, and organizational records for output quantity). Thus response bias or halo effect by and large is avoided in the present analysis.

Results

Hypothesis 1 was tested by means of correlational analysis. As predicted, interdependence was positively related to coordination ($r = .31$; $p < .001$, one-tailed). No significant relationships were found between interdependence

and the two output variables ($rs = .00$ and .11; n.s.). Coordination was positively related to both output quality and quantity ($rs = .36$ and .35, respectively; $p < .01$, one-tailed).

Table 1
Moderated Regression Analysis Results

Predictor Variable	*Output Quality*		*Output Quantity*	
	ΔR^2	R^2	ΔR^2	R^2
Coordination (A)	.131***	.131***	.060**	.060**
Interdependence (B)	.014	.145***	.001	.062**
A×B	.065*	.210***	.048*	.110**

*$p < .025$
**$p < .01$
***$p < .001$

Hypothesis 2 was tested by means of moderated regression, followed by subgroup correlational analysis to provide additional information regarding the magnitude of relationships for different levels of interdependence. In the latter case, the sample was divided into three approximately equal size groups of high, medium, and low level of interdependence. The moderated regression results (see Table 1) indicate that interdependence significantly ($p < .025$) moderated the relationships between coordination and the two output variables. The subgroup correlational analysis results (see Table 2) indicate that the higher the level of interdependence, the stronger the relationships between coordination and output quality and quantity. Taken together, these results provide strong support for Hypothesis 2.

Table 2
Subgroup Correlational Analysis Results

Relationship	*Level of Interdependence*		
	High	*Medium*	*Low*
Coordination—output quality	.46**	.39*	.18
Coordination—output quantity	.50**	.08	.04

*$p < .05$ (one-tailed)
**$p < .001$ (one-tailed)

Discussion

This study has sought to examine the link between interdependence and coordination in organizations. Results indicate that interdependence not only relates significantly to coordination, but it also moderates the relationships between coordination and output quality and quantity. These findings thus provide new and additional support for Thompson (1967) and others' propositions that the higher the level of interdependence, the greater the demand for coordination in organizations. Furthermore, they also reinforce Weick's important call to "treat interdependence as a variable rather

than a constant" (1974, p. 357) in organizational analysis. Future research should investigate the relationships between interdependence and other major organizational variables, thus leading to a better understanding about the role of interdependence in organizations.

Several theoretical and research implications can be derived from this study's findings. First, although interdependence explains a significant portion of the coordination variance, it alone does not determine the level of coordination in an organization. As pointed out in the earlier theoretical discussion, interdependence determines only the *minimum* level of coordination an organization has to attain in order to function, but not the actual level of coordination attained. According to Thompson (1967), the attainment of good coordination depends on the appropriate use and effective employment of various coordinating mechanisms. Thus, in order to account more fully for the level of coordination in organizations, one needs to examine both the organization's level of interdependence and its effective use of appropriate coordinating mechanisms.

Second, the present finding of a positive association between interdependence and coordination and Van de Ven et al.'s (1976) finding of a positive association between interdependence and an overall use of various coordinating mechanisms can be combined and interpreted as suggesting the following linkages between interdependence and coordination. As the level of interdependence increases, the requisite level of coordination for organizational functioning also increases. Accordingly, organizations increase their use of various coordinating mechanisms. To the extent that the appropriate coordinating mechanisms are employed, and employed effectively, a high level of coordination is achieved. Such an interpretation provides a more complete description of the link between interdependence and coordination than has been suggested in the literature.

Third, contrary to common beliefs, the relationship between coordination and organizational performance appears not to be uniform across organizations. As shown in Table 2, coordination relates much more strongly to output quality and quantity in the high interdependence group than in the low interdependence group. Specifically, coordination accounts for about 21 percent of the output quality variance in the high group as compared to about 3 percent in the low group. It also accounts for about 25 percent of the output quantity variance in the high group as compared to about zero percent in the low group. Thus, interdependence is an important moderator of the coordination-organizational performance relationship, and it should be included in future studies in this area.

Fourth, as indicated by the amount of variance explained (see Table 2), coordination appears to be a major determinant of the output quality ($r^2 = .21$) and output quantity $r^2 = .25$) of high interdependence organizations. Thus, in accounting for organizational output, one might do well to select the explanatory variables based on the level of interdependence of the organizations studied. When interdependence is high, the inclusion of coordination as an explanatory variable probably would enhance the

variance explained in organizational output. When interdependence is low, coordination probably would add little to variance explained and thus may be excluded for the sake of parsimony. Interdependence thus can be treated as a contingency factor in future research and theorizing about organizational output.

Finally, as this is a correlational study, no causality can be concluded from the observed relationships among interdependence, coordination, and output quality and quantity. Furthermore, because all but one (output quantity) of the measures were based on perceptual data (although they were from different respondent groups), the present findings should be interpreted with caution. At any rate, this study has provided an empirical base from which more rigorous research can be developed. If the study of organizations as system entities is to be effective, more must be known about the implications of interdependence for organizational functioning and effectiveness. The study reported here represents a step in that direction.

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Research Notes

JOB AND LIFE SATISFACTIONS: A CAUSAL ANALYSIS OF THEIR RELATIONSHIPS[1]

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Brayfield, Wells, and Strate (1957) indicated a need for research examining the functional relationship between job satisfaction and general life satisfaction. However, research examining this relationship has not been overwhelming. In fact, the literature concerned with the functional or causal relationship between work and life (nonwork) satisfactions provides inconsistent results. Most studies have suggested that work or on-the-job experiences and satisfaction influence nonwork or life satisfaction (Chisholm, 1978; Iris & Barrett, 1972; Kohn & Schooler, 1973; Kornhauser, 1965). On the other hand, other researchers (Blood & Hulin, 1967; Hulin, 1969; Schuler, 1973; Shepard, 1970; Tunstall, 1962) have implied that nonwork factors affect work attitudes. Unfortunately, most of these studies have utilized static correlational designs and do not, therefore, warrant causal inferences regarding the interactions between work and nonwork satisfactions. A recent exception has been a study by Orpen (1978), who conducted a cross-lagged correlational analysis on data obtained from 73 South African managers over a 12-month period. His results suggested that work satisfaction influences nonwork satisfaction.

Scholars (Bass & Bass, 1976; Campbell, Converse, & Rodgers, 1976; Staines, 1977; Wilensky, 1960) have argued that work and nonwork are in mutual relation and that satisfaction with work can influence an individual's satisfaction with life in general and vice versa. The job/life satisfaction literature, from both a conceptual as well as a philosophical perspective, implies the possibility of two basic models—namely, spillover and compensatory—to describe the relationship between job and life satisfactions. Although the terms "spillover" and "compensatory" were used originally (Wilensky, 1960) to describe the relationship between work and nonwork content and experiences, recently many authors—for example, Orpen (1978); Rice, Near, and Hunt (1980)—have used these terms to describe the connection between one's affective responses to work and nonwork as well as life spheres. The spillover model suggests congruency or

[1]The data utilized in this paper were collected by Robert Quinn and Graham Staines of the Institute for Social Research, the University of Michigan, and made available by the Inter-University Consortium for Political and Social Research. Neither the original collectors of the data nor the Consortium bears any responsibility for the analyses or interpretations presented here.

a positive effect. The compensatory model suggests contrasts or a negative relation or effect between job and life satisfactions. Thus, theoretically, it is believed that a person's job experiences and satisfaction could affect his/her life satisfaction positively or negatively and his/her nonwork or life satisfaction could affect job satisfaction positively or negatively. Even though the relationship between job and life satisfaction has been demonstrated, the empirical data on the causal relationship remain ambiguous.

Clearly, there is a need for more studies that would provide inferences regarding the functional relationship between work and nonwork satisfactions. From both theoretical and practical standpoints it is important that the direction of the relationship be identified, especially given the concern for improving the quality of life in the workplace. If work satisfactions influence nonwork attitudes, then programs such as job redesign that attempt to enhance job satisfaction will improve not only the quality of work life but also the overall quality of life of workers. On the other hand, if nonwork activities, experiences, and satisfaction affect work satisfaction, then attempts at improving quality of work life through job redesign or other work innovations will be less meaningful. This also may suggest that nonwork satisfaction can be an important determinant of work withdrawal responses, such as absenteeism and turnover. Moreover, as Rice et al. (1980) have suggested, the nature of the relationship between job and life satisfactions may describe the relationship between the general work and nonwork elements of life. This study, therefore, addresses an old but yet unanswered question regarding the nature of the relationship between work and nonwork satisfactions. The present study employs longitudinal data to overcome some of the deficiencies of the earlier studies.

Method

The data used in this study were obtained from the 1973 and 1977 quality of employment surveys conducted by the Survey Research Center of the University of Michigan (Quinn & Shepard, 1974; Quinn & Staines, 1979). These two surveys used a national probability sample that is representative of the American labor force. In this study, data from a panel of workers ($n = 1086$) interviewed in both 1973 and 1977 are used. Comparisons of the demographic and occupational characteristics, in terms of sex, race, age, and collar color, of the survey respondents were found to be similar to those of the American labor force (Quinn & Staines, 1979).

Job Satisfaction Measures. In both the 1973 and 1977 surveys respondents were asked to describe their feelings toward different job aspects on a 4-point scale. In all, 33 facet-specific satisfaction questions were asked. To obtain the major distinct aspects of job satisfaction for this study, the responses were factor analyzed using a principal components procedure and varimax rotation. (The table showing the rotated factor loadings is available from the author.) The rotated factor loadings reveal six distinct factors that are commonly used in studies of job satisfaction. Thus, indices of satisfaction

with supervision, work itself, working conditions, co-workers, pay and promotion, and authority and responsibility were obtained by calculating the mean of the responses to the appropriate items. The internal reliability estimates were calculated for the measures (1973 and 1977) of satisfaction with supervision (.87 and .88), work itself (.81 and .78), working conditions (.67 and .62), co-workers (.84 and .77), pay and promotion (.73 and .72), and authority and responsibility (.67 and .73).

Life Satisfaction Measure. An index of nonwork satisfaction was obtained from both the 1973 and 1977 surveys. This consisted of eight bipolar adjectives that the respondents used to describe the feelings about their present life. The internal consistency estimates for the 1973 and 1977 measures were .90 and .88, respectively.

Analysis. To determine the source and direction of causal influence in the present panel data, the frequency of change in product moment (FCP) technique was used. (Yee and Gage, 1968, give a detailed discussion of this technique.) This technique was chosen over the more popular cross-lagged correlation analysis because the latter does not distinguish between the source and direction of influence of two correlated variables (Feldman, 1975; Rozelle & Campbell, 1969). More recently, Kenny and Harackiewicz (1979) also have cautioned about the use of cross-lagged analysis as a means of proving clear causal inference. The FCP, unlike cross-lag correlation, is able to determine the variable of greatest influence and also whether this variable increases the correlation (positive effect) or decreases the correlation (negative effect).

In the present data, therefore, the FCP analysis would check for four possible causal relations; (1) positive job satisfaction (JS+), where job satisfaction is a source of positive influence on life satisfaction; (2) negative job satisfaction (JS−), where job satisfaction is a source of negative influence on life satisfaction; (3) positive life satisfaction (LS+), where life satisfaction is the source of positive influence on job satisfaction; and (4) negative life satisfaction (LS−), where life satisfaction is the source of negative influence on job satisfaction.

Results

Table 1 presents the results obtained by the FCP analysis. Respondents with missing data for any item were excluded from the analysis. The frequencies for the four categories of influence—positive job satisfaction (JS+), negative job satisfaction (JS−), positive life satisfaction (LS+), and negative life satisfaction (LS−)—are shown as well as the chi-square values that tested the significance of the differences between these influence categories. The results indicate that job satisfaction influence occurred more often than did life satisfaction influence. Satisfactions with supervision, working conditions, and pay and promotion were found to be sources of significant influence on life satisfaction. The direction of influence was congruent or positive in the case of supervision and pay and promotion, and

Table 1
Frequency of Change in Product Moment Analysis

Variables	*Frequencies*				*Chi-Squares*[a]		
	JS+	*JS−*	*LS+*	*LS−*	H_1	H_2	H_3
Supervision	208	72	149	77	5.55*	9.42*	.11
Work itself	182	67	167	90	.10	.56	3.08
Working conditions	182	96	167	61	4.74*	.56	6.94*
Co-worker	192	78	167	69	2.15	1.60	.43
Pay and promotion	213	73	147	73	8.35*	11.74*	.01
Authority and responsibility	182	67	195	62	.10	.38	.12

[a]Yates' correction applied to chi-squares. H_1: (JS+ + JS−)>(LS+ + LS−); H_2: JS+>LS+; H_3: JS−>LS−. In the case of work itself, H_1: (LS+ + LS−)>(JS+ + JS−) and H_3: LS−>JS−, and in the case of authority and responsibility, H_1: (LS+ + LS−)>(JS+ + JS−) and H_2: LS+>JS+.

*$p < .05$

it was incongruent or negative for working conditions. Statistically significant results were not found in the case of co-worker satisfaction, though the frequencies indicate that co-worker satisfaction serves as a source of causality for life satisfaction in a congruent or positive manner. On the other hand, satisfactions with both work itself and authority and responsibility were likely to be influenced by life satisfaction. The frequencies for LS+ and LS− were greater than were those for JS+ and JS−, but these were not significantly different. In the case of work itself satisfaction, the direction of influence was negative and the chi-square value was marginally significant ($\chi^2 = 3.08$, $p < .10$).

Discussion

In a general sense the results are more supportive of the notion that job satisfaction has a greater influence on life or nonwork satisfaction than vice versa. This is quite consistent with the position that is taken on the relationship between work and nonwork life by most researchers (Blauner, 1964; Iris & Barrett, 1972; Kornhauser, 1965; London, Crandall, & Seals, 1977; Meissner, 1971; Orpen, 1978; Rice, Near, & Hunt, 1979; Rousseau, 1978; Seligman, 1965). According to them, work attitudes and experiences are major factors in determining one's nonwork behaviors and attitudes. It should be noted that all of them except Orpen have inferred causality based on cross-section data. This study, furthermore, points out that extrinsic and not intrinsic job satisfaction serves as a source of one's life satisfaction. In the case of the relationship between job satisfaction aspects that are intrinsic in nature (work itself and authority and responsibility) and life satisfaction, no clear causal source was identifiable, although the frequencies of the z scores hinted that life satisfaction may be a cause for job satisfaction. In their review, Near, Rice, and Hunt (1980) implied that workers would be more satisfied with life overall if their jobs included higher levels of responsibility. This is not borne out in the present study. Instead, the results suggest that workers who are more, rather than less, satisfied

with supervision, pay, and promotion also are more satisfied with life. It should be noted that the studies reviewed by Near et al. (1980) measured perceptions of job dimensions and not affective responses to these dimensions. They argue that social structures (job dimensions) are more likely to determine attitudes (nonwork/life satisfaction) than vice versa, and therefore positive correlations between these variables are indicative of work experience and satisfaction influencing life satisfaction. The present study, on the other hand, is a direct causal test of the relationship between job and life satisfactions.

The results on the direction of the influences indicate that job satisfaction is a congruent or positive source of influence on life satisfaction. Specifically, increases in satisfaction with supervision and pay and promotion are likely to increase one's life satisfaction, and decreases in these job satisfactions are likely to decrease life satisfaction. This finding provides support for the "spillover" relations between job and life attitudes and is consistent with the findings obtained by Iris and Barrett (1972). They obtained significant positive correlations between satisfaction with supervision and pay and satisfaction with life in general. Moreover, the data also indicate that satisfaction with working conditions is a negative or incongruent source of influence on life satisfaction. That is, attitudes toward working conditions inversely affect life satisfaction. This finding, therefore, is consistent with the "compensatory" relations between job and life attitudes. Although not explicitly tested here, the evidence in support of a compensatory relations model implies that as one's working conditions worsen, he/she would attempt to compensate by seeking rewards or satisfactions in nonwork life activities. The compensatory model also is supported in this study when the influence of life satisfaction on intrinsic (work itself) job satisfaction is examined. The data, though only marginally significant, suggest that as life satisfaction decreases, satisfaction with work itself increases, and as life satisfaction increases, decreases in work itself satisfaction can be expected. Life satisfaction is a source of inverse impact on satisfaction with work itself. Again, this compensatory model would imply that those who are less satisfied with life seek intrinsic satisfactions on the job. No definite reasons are readily discernible, though it suggests that the relationship/effect between life satisfaction and intrinsic job satisfaction appears to be less clear than that with extrinsic job satisfaction. The recent study by Rice et al. (1979) found that nonwork factors contribute substantially to the prediction of job satisfaction. On the other hand, Rousseau (1978) found moderate correlations between nonwork satisfaction and worker perceptions regarding opportunities for challenging and responsible work. The present findings, however, imply that efforts to improve quality of work life by enhancing the intrinsic aspects may have a dubious impact on the quality of life itself. They also suggest that efforts concerned with improving quality of life cannot ignore the job context (extrinsic) factors and focus only on the job content (intrinsic) factors. The former appears to be a more positive source of life satisfaction than the latter.

Future research in this area should continue this line of causal research because the nature of the relationship between job and life satisfactions is still an empirical question. Secondly, future research should examine whether or not individual difference factors may contribute to variation in the job-life satisfaction relationship. Recently, researchers (Champoux, 1981a, 1981b) have suggested that one's self-concept and personality aspects such as need for achievement affect the relationship he/she forms between work and nonwork. It is not clear, however, whether those factors also would influence the job-life satisfaction relationship. Moderator research using other variables such as job level and occupation prestige would be potentially useful in describing the relationship between job and life satisfactions. Nonetheless, theoretical and policy implications are significant enough that more research in this area is clearly warranted. In fact, the results of this analysis question the notion that both intrinsic and extrinsic work place satisfactions affect life satisfaction. The only clear support is for the influence of extrinsic job satisfactions, such as satisfaction with supervision, pay, and promotion, on life satisfaction.

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MANAGERIAL WORK: THE INFLUENCE OF HIERARCHICAL LEVEL AND FUNCTIONAL SPECIALTY[1]

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The picture of the manager as a reflective planner, organizer, leader, and controller (Fayol, 1916) recently has come under strong attack (Lau & Pavett, 1980; McCall & Segrist, 1980; Mintzberg, 1980). In his description of managerial work, Mintzberg (1980) concluded that the manager's job can be described in terms of 10 roles within 3 areas—interpersonal, informational, and decisional—that are common to the work of all managers. Subsequent research has supported the generalizability of these role descriptions in public and private sector organizations and in lower and middle level managerial positions (Alexander, 1979; Kurke & Aldrich, 1979; Whitely, 1978). The purpose of the present paper is to examine the influence of hierarchical level and functional specialty on managerial roles and required skills, knowledge, and abilities.

Mintzberg (1980) proposed that differences in managerial work involve the relative importance of the roles across hierarchical level and functional specialty. Chief executive officers (CEOs) focus considerable attention on external roles (e.g., liaison, spokesperson, figurehead) that link the environment with the organization. At lower levels of the organization, however, work is more focused, more short term in outlook, and the characteristics of brevity and fragmentation are more pronounced. As a result, the external managerial roles are relatively less important and real-time internal roles (e.g., disturbance handler, negotiator), concerned with daily operating problems and maintaining the workflow, become relatively more important. When examining the effect of hierarchical level on the importance of Mintzberg's roles, Alexander (1979), Paolillo (1981), and McCall and Segrist (1980) found that the perceived absolute importance of both internal and external roles increased with management level. Although the rank ordering of role importance remained similar across hierarchical levels, in no case were any of the roles rated more important by lower level managers. Mintzberg does not specify whether other internal roles, such as leader or resource allocator, are more or less important at lower levels. Given the nature of the roles, *it is hypothesized here that lower level managers would perceive*

[1]The views expressed in this paper represent the opinions of the authors, not necessarily those of the Navy Department. The authors wish to thank Donald Helmich and two anonymous reviewers for their helpful comments.

the internal roles of disturbance handler, negotiator, and leader as more important than would upper level managers. The remaining roles should be viewed as more important by upper level than by lower level managers.

With respect to the influence of functional specialty on the nature of managerial roles, Mintzberg (1980) suggests that production, sales, and staff managers tend to focus their time on different sets of roles. He hypothesizes that interpersonal roles are more important to sales managers; staff managers give more attention to informational roles; and production managers attend to decisional roles. Both Alexander (1979) and McCall and Segrist (1980) have found empirical support for this hypothesis.

The present research extends the work of Alexander (1979), Paolillo (1981), and Mintzberg (1980) by looking at the perceived importance of Mintzberg's roles across several different functional areas, including a relatively ignored segment of the managerial population—namely, the general manager. *It is hypothesized that there will be significant differences among functional specialties on perceptions of role requirements.*

Although there is some empirical support for the influence of hierarchical level and functional specialty on managerial role requirements, the influence of these factors on required skills, knowledge, and abilities remains more speculative in nature. Katz (1974), for example, proposes that the relative importance of three broad managerial skills (conceptual, technical, and human) is dependent on the manager's rank in the organization. Conceptual skills should be most important at top managerial levels, technical skills at the lower levels, and human skills should be important at all levels. Another set of skills, not addressed by Katz, may be important for managerial success, and these involve political behaviors. Self-serving behaviors (Robbins, 1979), such as enhancing one's position, building a power base, and establishing the right connections, fall under the label of politicking. Given the hierarchical nature of organizations, political skills should be most important to middle level managers. Other than the work of Lawrence and Lorsch (1967), virtually nothing is known about the perceived importance of managerial skills to functional specialists and general managers. The present research empirically examines Katz's (1974) hypothesis and also examines the differential importance of the four managerial skills across functional and general management areas.

Method

Sample. Questionnaires were mailed to managers and executives representing a wide variety of private sector service and manufacturing firms in southern California. Responses were received from 23 percent ($N = 228$) of the managers. Missing data reduced the sample size to 180. This sample included 20 CEOs, 121 middle level managers, and 39 lower level managers. Managers worked in sales and marketing ($N = 34$), production and engineering ($N = 37$), accounting and finance ($N = 14$), research and development ($N = 14$), personnel administration ($N = 30$), and general management ($N = 51$).

Measures. Based on the work of Mintzberg (1980), McCall and Segrist (1980), and Lau, Newman, and Broedling (1980), 54 items were developed to measure the perceived importance to managerial success of Mintzberg's 10 roles (plus an eleventh technical expert role). A split-sample factor analysis, which used a principal component solution with orthogonal rotation to the varimax criterion, yielded six factors that were stable (correlations ranged from .86 to .92) across both groups (Veldman, 1967). Items that did not clearly load (.40 and above) on any of the factors were deleted. Analytic oblique rotations, which yielded 11 factors, then were performed to examine the content validity of the reduced set of items. Of the 11 factors, 7 clearly represented Mintzberg's roles. The eleventh factor represented the technical role. The sample-to-item-size ratio was not large enough to use the factor analysis as a basis for replacing the a priori roles with factor derived scales. Hence, these analyses were used to delete extraneous items and to examine the correspondence between the survey items and Mintzberg's roles. This procedure resulted in the use of 46 items that were grouped together on an a priori basis to measure the rated importance of the 11 roles.

Using the work of Katz (1974) and an initial survey of managers (Lau et al., 1980), 30 questions were developed to measure the perceived importance of managerial skills for successful job performance. These items were factor analyzed using a principal component solution and orthogonal rotation to the varimax criteria. The 22 items that had loadings of over .40 produced four major factors that reflected: (1) conceptual skills (six items), (2) human skills (eight items), (3) technical skills (three items), and (4) political skills (five items).

Results

The differences between hierarchical levels of the rated importance of the 11 managerial roles were examined by using analysis of variance and a posteriori Student *t*-tests. The data, which are presented in Table 1, yielded significant differences between top and lower level managers on 8 of the 11 roles. Of these eight roles, significant differences also are found between middle and lower level managers for six of the roles. As predicted, the external roles of liaison, spokesperson, and figurehead are rated as significantly more important at higher levels of management. Also as predicted, the leader role is rated as significantly more important for lower level managers than it is for either middle or top level managers. Three roles did not produce significant F values: entrepreneur, disturbance handler, and technical expert. The results for the disturbance handler and negotiator roles do not support the hypothesis. Kendall's coefficient of concordance indicated that the relative importance of these 11 roles was similar ($W = .88$) across the three hierarchical levels.

Table 2, which presents the means, F statistics, and the results of Duncan's multiple range tests, indicates that functional area has a significant ($p \leq .05$) influence on the rated importance of 5 of the 11 roles. Managers in

Table 1
Importance of Mintzberg Roles by Hierarchical Level

	Mean Value	F	Significant Differences[a] Between: Top & Middle	Middle & Low	Top & Low
Interpersonal roles					
Figurehead					
Top level (CEO)	3.65				
Middle level	3.12	5.98*		*	*
Lower level	2.45				
Leader					
Top level	4.87				
Middle level	4.91	9.65**		*	*
Lower level	5.79				
Liaison					
Top level	3.68				
Middle level	3.12	3.84*			*
Lower level	2.72				
Informational roles					
Monitor					
Top level	4.36				
Middle level	3.88	5.68*		*	*
Lower level	3.25				
Disseminator					
Top level	5.17				
Middle level	4.85	5.45**		*	*
Lower level	4.19				
Spokesperson					
Top level	3.58				
Middle level	2.95	2.94*			*
Lower level	2.60				
Decisional roles					
Entrepreneur					
Top level	4.50				
Middle level	4.35	.10			
Lower level	4.37				
Resource allocator					
Top level	5.75				
Middle level	4.97	15.59**	*	*	*
Lower level	3.89				
Disturbance handler					
Top level	5.15				
Middle level	4.77	.91			
Lower level	4.65				
Negotiator					
Top level	2.84				
Middle level	2.55	8.52**		*	*
Lower level	1.64				
Technical expert					
Top level	2.71				
Middle level	2.53	1.19			
Lower level	3.03				

[a]Two-tail *t*-test, $p \leq .05$
*$p \leq .05$
**$p \leq .01$ with 2,177 d.f.

the various functional areas differed in their ratings of the leader, monitor, spokesperson, resource allocator, and technical roles. Mean score rankings indicated that there was a fair level of agreement ($W = .75$) across functional areas on the relative importance of these roles.

Table 2
Managerial Roles by Job Function

	Leader	*Monitor*	*Spokesperson*	*Resource Allocator*	*Technical*
Sales/marketing	5.62[a]	4.62[a]	3.00	4.47[c]	1.86[c]
Production/engineering	4.98[b]	3.34[c]	2.32[b]	4.91	3.90[b]
Accounting/finance	5.13	3.61	3.74[a]	5.83[a]	2.18[c]
Research and development	4.79[b]	3.63	3.52	4.50	4.83[a]
Personnel	5.26	3.31[c]	2.81	4.43[c]	1.95[c]
General managers	4.78[b]	4.05[b]	3.04	5.01[b]	2.17[c]
F (5,172)	2.54*	5.15**	2.64*	2.82*	13.64**

[a,b]Refers to comparisons within a column where the mean scores of group a are significantly ($p \leq .1$) higher than mean scores of group b.
[c]Mean scores of groups a and b are significantly ($p \leq .1$) higher than those of group c.
*$p \leq .05$
**$p \leq .01$

The analysis of variance between levels on the four skill areas yielded one significant ($p \leq .001$) difference. As predicted, conceptual skills are required to a greater extent on the CEO level ($\overline{X} = 5.72$) than they are at lower levels ($\overline{X} = 4.77$). No significant differences were found between levels for human (overall $\overline{X} = 5.96$), technical ($\overline{X} = 4.72$) or political ($\overline{X} = 3.57$) skills. These results did not support all of the predictions.

Table 3 presents the results examining the influence of functional area on the rated importance of four skill dimensions. Significant differences ($p \leq .05$) between functional areas were found across all four skills. These results support the hypothesized influence of functional specialty on perceptions of required managerial skills.

Table 3
Skill Importance by Job Function

	Human Skills	*Conceptual Skills*	*Technical Skills*	*Political Skills*
Sales/marketing	6.01	5.40[a]	4.62	4.07[a]
Production/engineering	5.97	5.03[b]	4.57[b]	3.11[b]
Accounting/finance	5.70	5.57[a]	5.47[a]	3.31
Research and development	5.48[b]	4.46[c]	4.97	3.07[b]
Personnel	6.05	4.94[b]	5.08	3.78
General managers	6.13[a]	5.56[a]	4.52[b]	3.64
F (5,172)	2.60*	5.77**	2.57*	3.33**

[a,b]Refers to comparisons within a column where the mean scores of group a are significantly ($p \leq .1$) higher than mean scores of group b.
[c]Mean scores of groups a and b are significantly ($p \leq .1$) higher than those of group c.
*$p \leq .05$
**$p \leq .01$

It should be noted that neither interaction between level and function nor interactions between organizational size and both level and function confounded any of the above results. In another part of the study, which

is not reported here, these interactions were examined via a two-way analysis of variance. None of the interaction effects were statistically significant.

Discussion

Results of this study indicate that hierarchical level contributes to differences in the rated importance of the managerial roles. Although the operational definition of Mintzberg's roles used here varied from previous studies, the present results differ only slightly from those of Alexander (1979) and Paolillo (1981). Specifically, all three studies indicate that the roles of disseminator, figurehead, negotiator, liaison, and spokesperson are more important at the higher managerial levels than at the lower levels.

Lower level managers rated leadership as more important for successful job performance than did either middle managers or CEOs. This result is not similar to the results of either Alexander (1979) or Paolillo (1981), who found no significant differences in the leadership role across levels. According to Mintzberg (1980), leadership involves interpersonal relationships, motivational activities, and an integration of individual and organizational goals. Because lower level managers are closest to the actual supervison of nonmanagerial personnel, these behaviors should be relatively important at this level.

The data also suggest that the relative importance of the managerial roles was similar across all three levels. These results support Mintzberg's (1980) contentions and available empirical evidence that managers at all levels perform similar roles but with different emphasis. However, Mintzberg developed these roles from his observations of senior executives. It is possible that these role descriptions do not apply as accurately to lower level managers as they do to upper level managers. This may explain why the present, and past, research findings indicate that the majority of the roles are more important at upper organizational levels.

The type of job a manager holds has some influence on the perceived importance of the managerial roles. Some support was found for Mintzberg's (1980) contention that sales managers emphasize interpersonal roles (e.g., leader) and staff specialists in accounting and finance emphasize informational roles (e.g., spokesperson). As would be expected, R&D personnel rated the technical expert role significantly higher than did managers in other areas. However, the results provide little definitive information on the job of the general manager as compared with the functional specialist. The job of a general manager may include several different specialties and require behaviors that are neither dramatically different from nor exactly the same as any particular functional specialist. No clear patterns emerged from the data to suggest that certain functional specialists are distinct as a group, but there is some consistency across the different functional areas on the rankings of role importance.

Hierarchical level influences only the degree to which conceptual skills are seen as important for managerial success. As predicted by Katz (1974),

the ability to coordinate and integrate the organization's interests and activities is considered relatively important at the CEO level. Contrary to speculations in the literature, technical skills were reported as equally important across levels, as were political skills. It is noted that human skills were rated as most important for successful job performance regardless of level. Human skills included listening skills, verbal communication skills, patience, understanding subordinate's needs, and written communication skills. These human skills, according to Katz, are essential to effective administration at every level, and as one moves up the hierarchy the need for human skills becomes "proportionally, although probably not absolutely, less" (1974, p. 95). The present results confirm Katz's theorizing about these human skills.

As predicted, functional area influences the perceived importance of the four categories of managerial skills. General managers rated human skills as more important than did R&D managers. This result may be comparable to Lawrence and Lorsch's (1967) findings on the environmentally induced differences between sales and production managers. Specifically, the general manager may be operating in a much less structured and predictable environment than the R&D manager. The amount of relative environmental uncertainty in the general manager's subsystem may well enhance the importance of working with and through people to accomplish organizational objectives. The results for the remaining three skill areas are somewhat less interpretable. For example, sales and marketing, accounting and finance, and general managers felt that conceptual skills were more important than did production and engineering and personnel managers. Contrary to intuitive expectations, R&D managers rated this skill significantly lower than did all other managers. Some of the differences here could be attributed to what Lawrence and Lorsch (1967) call cognitive differences between managers in different departments. As could be expected, political skills are most important to sales and marketing managers. Surprisingly, technical skills are significantly more important to accounting and finance managers than they are to production and engineering managers.

Traditionally, managers have been treated as a homogeneous group. As Nealey and Fiedler (1968) assert, the majority of management theory does not give much attention to differences between levels of management or functional areas of management. A promotion system of choosing management successors from among lower level managers—because they are successful at that level—assumes that success at higher levels is guaranteed if the same skills that produced success at lower levels are used. On the other hand, the contingency model of management posits that although there is a common set of roles that managers perform, effective managers behave differently in different situations. The present study lends further support to this contingency approach to management.

As with similar research, the inferences drawn from this study must be tempered by the retrospective self-report and descriptive characteristics of the data. The present study has its limitations, but it provides a foundation

for future research into the nature of managerial work. Further research is needed to identify the types of managerial behaviors, roles, and skills that predict objective criteria such as job performance and organizational effectiveness. Research also is needed to identify other salient contingency variables that influence the nature of managerial work. The combination of information obtained from the present study and suggested future studies would be valuable to educators, researchers, and managers.

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THE EFFECTS OF REPRESENTATIVES' POWER WITHIN THEIR OWN ORGANIZATIONS ON THE OUTCOME OF A NEGOTIATION

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There has been much interest recently in the nature and dynamics of interorganizational relationships (Cook, 1977; Starbuck, 1976; King, Jackson, & Seror, 1979). Often organizations are linked by interactions between members of the respective organizations. Adams (1976) envisioned each organization as a separate open system, and the person who links one organization with another as a boundary spanning person. When these boundary spanning persons (BSPs) meet, they are separated from the other members of their own organizations (their constituents), thus constituting a separate boundary spanning system. However, representatives must deal not only with one another regarding the terms and conditions of their association but also with their respective constituents regarding the acceptability of those terms and conditions (Breaugh & Klimoski, 1977; Klimoski, 1972; McGrath, 1966). Walton and McKersie (1965) note that labor negotiators operate in a stressful state of role conflict because they must deal with both the other negotiator and their own constituents.

Previous studies of interorganizational linkage through boundary spanning activities focus on (1) the relationship between the BSPs themselves (the negotiation process or outcome), (2) the relationship of the BSPs to their constituents, or (3) the effect of BSP-constituent relationships on the outcome of the negotiation.

Rubin and Brown (1975), Deutsch (1961), Walton and McKersie (1965), and McGrath (1966) discuss several issues such as interpersonal orientations of bargainers and physical components of the bargaining situation that relate to the first focal area. There appears to be a smaller but still sizable number of studies that address the second focal area. For example, Klimoski and Breaugh (1977) studied the favorableness of performance evaluations for BSPs who are members of the constituent group versus those who are representatives or spokespersons only.

In the third focal area, a small but growing number of studies examine how the relationship between BSPs and their constituents affects the negotiation itself. Two facets of the BSP-constituent relationship have drawn particular attention: (1) the BSPs' status within their own organizations, and (2) the BSPs' accountability to their constituents. It has been hypothesized that higher status BSPs or those not accountable to their constituents will

achieve superior outcomes in bargaining (i.e., quicker and/or better agreements).

Status

Hermann and Kogan (1968), Kogan, Lamm, and Trommsdorff (1972), and Klimoski and Ash (1974) have reported studies that tested the effect of BSP status on negotiation outcomes. These experiments required members of small groups to arrive at a group ranking on a consensus ranking task, then through a BSP to negotiate a combined ranking with another group. Hermann and Kogan manipulated status by assigning upperclass students to the role of "leader" (though no special duties were assigned to the leaders), and lowerclassmen to subordinate roles. Klimoski and Ash led some subjects to believe that they were elected to the group leader role and others to believe that they were appointed. Election was assumed to result in higher status than appointment. All studies required higher status BSPs to negotiate among themselves and lower status BSPs to do the same. Only Kogan et al. (1972) used a task that allowed for interaction of the BSP and constituents after the original meeting of the subjects. In most studies the subjects were told that they would see their constituents after the negotiation. None of these studies reported awarding performance-dependent pay for participation. No effects were noted on the amount of time required to complete the negotiation, the number of deadlocks that occurred, or the quality of the solution obtained. However, Kogan et al. reported ceiling effects on their time measure.

Accountability

Another group of studies examined the effect of BSP accountability to their constituents on the outcome of a negotiation. Gruder (1971) and Klimoski (1972) manipulated accountability by telling accountable BSPs that they would report back to their constituents, but nonaccountable BSPs were told that they would not see their constituents again. Benton (1972) manipulated accountability by varying the amount of participation (none, shared, total authority) the BSPs had in determining the level of their own compensation. Haccoun and Klimoski (1975) manipulated accountability by having constituents observe the negotiation actions of accountable BSPs and strangers observe nonaccountable BSPs. Breaugh and Klimoski (1977) required accountable BSPs to have their negotiation terms ratified, but nonaccountable BSPs were not required to obtain constituent ratification. Both Benton (1972) and Klimoski reported significantly less time required for negotiation among nonaccountable BSPs. Their experimental tasks, however, apparently did not allow them to determine whether this time reduction was gained at the expense of lower quality solutions/agreements. Only Benton made subjects accountable to their constituents for monetary payoffs. In the other studies, in which groups had no previous experience

together and no expectation of ever seeing or working with one another again, apparently accountability occurred only if the BSPs believed that their performance was observed by an audience (i.e., their constituents). However, the negotiation opponent and experimenter also constituted an audience. Can it be assumed that BSPs cared more about the evaluation of their performance by their constituents than by these others?

The concepts of status and accountability appear to operate through the representatives' need to accept the influence of their constituency or their ability to resist this influence. These explanatory variables appear to be related to the extent to which the constituents have power over the representatives. In fact, studies and theoretical treatments appear to assume that either the BSPs are subordinate to their constituents or neither has power over the other. Yet the BSP may in fact have power over the constituency.

Power

Power has been defined as the ability of one actor to influence another toward acting in a certain way (Shaw, 1976). Emerson (1972) envisions power as arising in exchange relationships when one actor has the ability to induce cost for the other. He proposes that power arises from the dependence of one actor on another. A power advantage or imbalance arises when one party is more dependent than the other on the relationship (Cook, 1977).

Several researchers have studied the effect of the relative power of organizations involved in a negotiation (Rubin & Brown, 1975). The power that BSPs have within their own organizations, however, is an entirely different issue.

BSPs can be viewed as having an exchange relationship with their own organization, each gaining from the association. BSPs must satisfy their constituents regarding the way the negotiation is conducted when the constituents mediate one of their critical needs (such as the need to remain employed). However, constituents may not mediate critical needs of the BSP, but rather their critical needs are mediated by the BSP. Chiefs of state or chief executives who negotiate on behalf of their organization or state, for instance, may have the power to hire and fire subordinates, veto legislation, and so on. In such a case, the constituency may be obliged to accept the terms negotiated by the high-power BSP.

Hypotheses

A BSP who has power over the constituents will be relatively insulated from censure regarding negotiation outcomes and processes and thus has freedom to negotiate in a flexible manner. This should result in fewer constraints being placed on negotiation, and thus more plausible alternatives for settlement. Further, the other organization should have a high expectancy regarding the high power BSP's ability to ensure that the organization lives up to any agreements. Therefore, in comparison with negotiations

involving at least one low power BSP, negotiations between high power BSPs should result in: (1) negotiations completed in less time, (2) fewer deadlocks, (3) more resources exchanged, (4) greater productivity as a result of the more abundant resources obtained, and (5) greater satisfaction. Similarly, a negotiation involving one high powered BSP should have fewer constraints than one that involves only low powered BSPs.

Method

Subjects in this study were 120 undergraduate student volunteers. They participated in groups of four, which were formed into subgroups of two members each. Each subgroup (referred to in this experimental simulation as an "organization") was given an "inventory" of resources (letters of the alphabet) which would later be used in a "production task" (forming words). Compensation was based on the number and length of words formed. Subjects were randomly assigned to either a high or low power role within their organization. The two groups were given an opportunity to bargain with one another in order to try to enhance their mix of letters for forming words. In 10 cases, the high power person in each organization was designated that organization's representative in the negotiation (referred to as Hi-Hi negotiations); there also were 10 Hi-Lo and 10 Lo-Lo cases. After completing the negotiation and word formation tasks, subjects responded to a postexperimental questionnaire. Each group completed the entire procedure in a single 2-hour period.

Negotiation Task. Negotiations consisted of up to five rounds of meetings between representatives. Negotiation sessions were not observed by constituents. Each round was followed by a meeting of a representative with his constituent in a private setting. Both negotiation and constituent-consultation meetings were approximately two minutes long. Representatives were not instructed how they should negotiate. They were instructed that when all exchanges were agreed on, a contract document would be filled out for ratification by each organization's high power member. Because the ratified contract documents could be returned either at the end of a negotiation session or after the BSP-constituent consultation session that followed, there were 2 possible time increments per round, or 10 in all.

Production Task. When the contract was ratified, the two organizations were given small wooden squares with the appropriate letters printed on them so that they could easily visualize and manipulate their inventory in forming words. After five minutes their official word list was submitted on a special form. It was evaluated for number of letters used correctly in forming words.

Manipulation of Power Variable. The high power member of each organization—its "Executive Director" (ED)—was briefed thoroughly on the tasks to be performed. This member was given the responsibility of (1) evaluating the performance of his subordinate, (2) awarding up to $3 as a performance-based component of the subordinate's pay, and (3) approving

and ratifying both the negotiated contract and the word report form. The ED was compensated on the basis of the organization's performance on the word formation task ($\overline{X}$ = $4.70; range: $1.50 to $7.25).

The other member of the organization, designated the "subordinate," was given a very short briefing of the upcoming tasks and told that he would receive in compensation for his participation $2 plus up to $3 to be awarded by his ED. Subordinates were advised to rely on the ED for additional information about their role. In terms of French and Raven's (1959) bases of social power, the EDs in this simulation were intended to have legitimate, expert, and reward power.

Two postexperimental questionnaire items served as manipulation checks. *T*-tests of these items indicated that the ED was perceived to be the more powerful member of the organization regardless of whether he served as BSP or constituent ($p = .01$, $df = 59$).

Results

Table 1 displays the cell means and standard deviations for all dependent variables. Hypotheses regarding effects of the independent variable condition (high power BSP negotiates with high power BSP, high power BSP negotiates with low power BSP, etc.) on the various dependent variables were tested using multiple regression. Only the hypothesis regarding negotiation time was supported. The overall regression equation was significant ($R^2 = .341$, $F = 4.49$, $p = .011$). The dummy variable representing the difference in time required to complete Hi-Hi versus Hi-Lo negotiations entered into the equation significantly ($b = .99$, $p = .011$). The dummy variable that represented the difference in time required to complete Hi-Hi versus Lo-Lo negotiations entered into the equation significantly ($b = 1.27$, $p = .008$). In addition, the regression coefficients for the two dummy variables had the predicted signs (positive; Hi-Lo and Lo-Lo negotiations were expected to require more time than Hi-Hi negotiations) and the predicted relative

Table 1
Means and Standard Deviations of Dependent Variables

Dependent Variable		*Total*[a]	*Hi-Hi*	*Hi-Lo*	*Lo-Lo*
Negotiation time	$\overline{X}$	8.93	8.20	9.20	9.40
	SD	1.14	1.14	1.03	.97
Deadlocks	$\overline{X}$	2.10	2.30	.90	3.10
	SD	2.16	1.34	1.10	3.04
Productivity (earnings)	$\overline{X}$	9.58	9.55	9.45	9.75
	SD	1.81	1.58	2.41	1.49
Resources exchanged	$\overline{X}$	11.07	11.90	11.40	9.90
	SD	3.76	2.51	5.32	2.92
Satisfaction efficiency	$\overline{X}$	50.83	51.40	51.70	49.40
	SD	6.83	6.36	7.35	7.23
Satisfaction effectiveness	$\overline{X}$	47.87	48.70	46.80	48.10
	SD	8.10	5.08	11.61	6.98

[a] N equals 30 for each dependent variable.

magnitude (Lo-Lo negotiations were expected to require more time than Hi-Lo negotiations). Thus, when both representatives held high power in their own organizations, negotiations were completed in less time than were negotiations between one high and one low or between two low power representatives.

Hypotheses about the other dependent variables were not supported.

Discussion

The finding that negotiation time was affected by the intraorganizational power of the BSPs is noteworthy. Of the six studies reviewed earlier that had hypothesized similar results, only two (Benton, 1972; Klimoski, 1972) had actually found this relationship. It is possible that earlier studies failed to support this hypothesis because of methodological weaknesses (in either the design or the experimental tasks). None of the four studies that found no effect on time reported a manipulation check to verify that the subjects actually felt a status difference, believed they would ever see the constituent again, or cared. In fact, in three of these studies there was no further contact between the BSP and the constitutent. Further, it is possible that a lack of incentive pay to motivate subjects may have reduced performance aspirations, although Breaugh and Klimoski (1981) found that paying subjects had no significant effect on negotiation outcomes. Some subjects may have simply accepted any outcome in order to minimize the amount of time they must invest in participating in the study. The present study employed numerous features intended to improve on the methods used in former studies.

The negotiation task involved an exchange of discrete resource elements. Thus a quantitative measure (number of letters traded) of negotiation effectiveness was possible.

A logical purpose was presented to the subjects for participating in the negotiation task. It was a means for obtaining resources that would be used in the production task (which was, in turn, promoted as the organization's purpose and focal activity and as a means of earning compensation).

BSPs and constituents had several opportunities to interact as the negotiation proceeded. Therefore the power differential between the roles was given an opportunity to influence the negotiation process.

Subjects rated the experimental task as a "highly" involving and "moderately" realistic one. There was no deception involved, and subjects reported overwhelmingly that they did believe that they would be compensated as promised. They indicated further that the incentive pay (averaging almost $5) was "moderately" important to them. Thus their valence for the incentive pay could be expected to encourage them to consider the consequences to themselves of their actions in the negotiation and consultation with their organizational colleague. As previously reported, a manipulation check was performed that indicated that a power difference between roles was in fact induced.

This simulation was designed to have a complexity and realism that would enhance the usefulness and validity of the results. However, the study required four subjects in order to collect a single observation.

The failure to confirm most of the hypotheses in this and the formerly cited studies suggests a reconsideration of the methods used. In particular, note that most of these studies are laboratory simulations involving a relatively low number of experimental observations. Small sample sizes often result in unacceptably low statistical power. If a "moderate" effect size could be assumed (Cohen & Cohen, 1975), the power for tests in the present study would be approximately .35. However, considering the small effect sizes in previous studies, the real power may be even lower. Therefore some of the results found to be in the predicted direction might prove to be statistically significant when sample sizes are larger.

This study suggests that when quick settlement is desired, organizations either should send higher ranking officials to negotiate or should invest more power in the negotiators who are normally used. Future studies should explore the causal mechanism by which representative power affects the negotiation outcome. Also to be studied are the conditions under which various levels of power can be expected to lead to desired outcomes.

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IS THE SIMULTANEOUS VERBAL PROTOCOL A VIABLE METHOD FOR STUDYING MANAGERIAL PROBLEM SOLVING AND DECISION MAKING?[1]

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During the past two decades, there has been an increasing interest by management and decision researchers in studying human (i.e., managerial) problem solving and decision making (Beach & Mitchell, 1978; MacCrimmon, 1973; MacCrimmon & Taylor, 1976; Slovic, Fischoff, & Lichtenstein, 1977). Despite this interest, however, many decision researchers have acknowledged that the processes involved in human problem solving and decision making still are not adequately understood. According to Payne, Braunstein, and Carroll:

> Part of the reason for this lack of understanding is that most decision researchers have used empirical procedures which are not suited to the identification of the processes which lead a decision maker to a particular judgment. Typically, research has been focused on data which reflect only the end product of the decision processes, for example, choice proportions, rankings or ratings. (1978, p. 17)

[1]The author would like to thank Arthur Jago, John Ivancevich, James Phillips, Andrew Szilagyi, Edwin Locke, Robert Keller, and the reviewers of this paper for the constructive comments they made on earlier versions of this paper.

Based on the seminal work of Newell, Shaw, and Simon (1958) and Newell and Simon (1972), several management and decision researchers have made use of the simultaneous verbal protocol as a method for tracing the problem solving and decision making processes involved in such diverse activities as: job choice (Soelberg, 1965); strategic decision making (Schweiger, 1980); consumer choice (Bettman, 1974; Bettman & Jacoby, 1976); investment trust decisions (Clarkson, 1963); the design of management information systems (Vitalari, 1980); the choice of living quarters (Payne, 1976; Svenson, 1974); aircraft accident investigation decisions (Braunstein & Coleman, 1967); and parole decisions (Carroll & Payne, 1977).

Typically, the use of verbal protocols involves asking subjects to "think aloud" while they are solving a problem or making a decision. The outcome of these activities usually provides the researcher with a map of the sequencing of thoughts involved in a decision as it actually occurs (Ericsson & Simon, 1980; Newell & Simon, 1972; Payne et al., 1978; Svenson, 1979). These verbalizations are tape-recorded, transcribed, and then content analyzed via some coding scheme. Coded protocols have been used in both exploratory and hypothesis testing research.

Although considerable use has been made of the verbal protocol, little empirical research has been conducted to assess directly the efficacy of the methodology itself, especially with respect to managerial problem solving and decision making. Methodological questions surrounding both its validity and its reliability have been raised in the literature (Ericsson, 1975; Ericsson & Simon, 1980; Hayes, 1968; Payne et al., 1978; Schweiger, 1981; Simon, 1979; Svenson, 1979), but several questions remain unanswered.

To advance understanding of the verbal protocol and to establish further both its limitations and its benefits for management and decision researchers, the present research addresses one methodological question that has arisen. Does the verbal protocol interfere with problem solving and decision making performance for complex tasks (i.e., tasks that require individuals to make several interrelated decisions characterized by numerous alternatives and attributes)?

By design, simultaneous verbal protocols are elicited from subjects while they are in the process of solving problems and making decisions. Specific problems or decisions vary, depending on the researchers' interests. As a result, several theorists (Reitman, 1970; Russo, 1978; Svenson, 1979) have proposed that the methodology has the potential for being obtrusive in these processes. The obtrusion, it is argued, is caused by the additional verbal response that is required from subjects. This response, which requires the use of mental effort, supposedly detracts from the effort that the individual could direct at the problem or the decision.

In a recent discussion of the cognitive processes involved in verbalization, Ericsson and Simon (1980) present a model describing how the verbalization process operates and how simultaneous verbal protocols impact problem solving and decision making processes. Based on an extensive review of the literature, the authors conclude that simultaneous verbal protocols

should not change either the course or structure of the problem solving or decision making process for tasks requiring simple recoding of nonverbal stimuli if subjects are not required to report on stimuli or processes that they are not attending to.

The published empirical evidence examining this issue, however, is extremely limited. In an experiment involving parole decisions, Carroll and Payne (1977) found no significant differences in process (i.e., number of items of information searched, time taken, final judgment) between protocol and nonprotocol groups. However, the authors recognized the problems involved in supporting the hypothesis that there were no differences.

In another study, Dansereau and Gregg provided anecdotal evidence based on an experiment with a single subject solving multiplication problems. The subject, who solved the problems both silently and aloud, claimed that "during the silent task the processing could be done much more rapidly than during the aloud stage" (1966, p. 72). He also claimed that thinking aloud helped him both to articulate his ideas and to retrieve information from memory. Based on these results, the authors argued that it is possible that the positive effects of verbalization on memory may be sufficient to offset any negative effects that could be due to its obtrusion. Although intriguing, a sample size of one makes any statistical conclusions tenuous.

To further understanding of the obtrusive nature of the simultaneous verbal protocol, it is critical that empirical research also examine its effects on process outcomes, such as performance. Research (Schweiger, 1980) indicates that the processes that individuals use to solve problems impact their performance on these problems. It remains only an inference at this point whether the lack of difference in process between protocol and nonprotocol groups leads to a lack of difference in performance between these two groups. For those researchers who are interested in studying the relationship between problem solving and decision making processes and task performance, empirical resolution of the obtrusive nature of simultaneous verbal protocols on performance is critical. If the verbal protocol affects problem solving and decision making performance, then it will cause problems of interpretation because the effects of obtaining a verbal protocol will be confounded with the effects of both the content and the process of thoughts as measured by the protocol.

The present study was conducted to assess the impact of the simultaneous verbal protocol on problem solving and decision making performance for a complex managerial task.

Method

Sample and Procedures. Subjects who took part in this study were 40 graduate business students enrolled in two sections of a business policy course. All subjects participating in this research engaged in a computer-simulated executive business game for 10 decision periods. For each period, subjects were required to make 17 decisions concerning the operation of

their simulated business while competing against four other subjects assigned to the same industry. For this task it was highly probable that if verbal protocols interfered with either problem solving or decision making processes, they would have affected the 17 decisions and thus performance (Schweiger, 1980).

Eight industries with identical characteristics (e.g., size of demand, economic conditions) were created. Subjects were assigned randomly to one of eight industries. Subjects also were assigned randomly to either a simultaneous verbal protocol condition (20 subjects) or a nonprotocol condition (20 subjects). Except for some brief instructions on verbal reporting given to the protocol group, both groups received the same written game instructions. Those subjects participating in the protocol group were simply instructed to "think aloud" while making decisions for periods 2 and 9 of the game. Those subjects participating in the nonprotocol group were not required to provide any responses other than their final decisions. Instructions were given to both groups by the same experimenter. All subjects in the protocol group provided taped protocols. Subjects in the nonprotocol group did not. Care was taken by the experimenter to avoid providing subjects with either verbal or behavioral cues pertaining to processes that would be useful in carrying out the task effectively.

Measures. Performance was assessed by three measures: operating profit, return on net assets, and market share. Based on a factor analytic study (Schweiger, 1980), operating profit and return on net assets were standardized and combined to create a composite measure of financial performance. Market share was used separately as a measure of market growth performance. Based on further factor analyses of each performance measure, two temporal factors also were developed: early performance (periods 3 through 7), and late performance (periods 8 through 10).

Results and Discussion

One-tailed *t*-tests between the means of the protocol and nonprotocol groups for early and late financial and market growth performance are reported in Table 1. The sizes of the *t*-values indicate that there were no significant differences in either early or late performance between the two groups (i.e., using a conventional probability level of .05). (An analysis using a nonparametric statistic, the Mann-Whitney test for two independent samples, also yielded nonsignificant results.) However, because the *t*-tests were based on a small sample ($N=20$ for each group), it might be argued that these results were due to a lack of power of the statistic that was used.

To resolve this issue, the probability levels (i.e., alpha) used to protect for Type I error were raised from .05 to the highest level for which the *t*-test values remained nonsignificant (i.e., .40 for early performance measures and .25 for late performance measures). This was done in order to reduce the probability of Type II error and thus avoid accepting the null

Table 1
Performance Differences Between Protocol and Nonprotocol Groups

	Early Financial Performance (Periods 3-7)	*Late Financial Performance (Periods 8-10)*	*Early Market Growth Performance (Periods 3-7)*	*Late Market Growth Performance (Periods 8-10)*
Protocol Group ($N=20$)				
Mean	1.52	-.05	.08	.88
S.D.	7.27	2.99	2.93	4.90
Nonprotocol Group ($N=20$)				
Mean	1.58	.32	-.18	.09
S.D.	-.81	2.58	4.23	5.48
t-Value	.03	.42	-.22	-.48

hypothesis when, in fact, it should have been rejected. Furthermore, in order to evaluate the power of the *t*-test to detect differences between the means at these new levels of alpha, a power analysis was conducted. Based on the procedure presented in Cohen (1969), when the level of alpha was equal to .40, there was a probability of .66 that the test was powerful enough to detect a small effect (i.e., a separation of the means by a .20 standard deviation), a probability of .92 that it was able to detect a medium effect (i.e., a separation of .50 standard deviation), and a probability of .99 that it was able to detect a large effect (i.e., a separation of .80 standard deviation). When alpha was equal to .25, the power of the test was .38 for a small effect, .83 for a medium effect, and .97 for a large effect. (It was possible that the lack of performance differences between the protocol and nonprotocol groups was due to the averaging of performance for periods 3 through 7, and for periods 8 through 10. Therefore, *t*-tests, Mann-Whitney tests, and power analyses were conducted for performance criteria resulting directly from decisions made in periods 2 and 9. The results obtained for each period for each performance criterion were virtually the same as the results obtained using the factor analyzed performance criteria.)

Based on the results, it appears reasonable to conclude that although it is not possible to prove the existence of no differences, it appears improbable that there were any effects in performance due to the use of simultaneous verbal protocols. An interpretation of the results seems to indicate that the lack of significant differences between the two groups may be due to the simplicity of the "think aloud" instructions that were given to the protocol subjects (Ericsson & Simon, 1980). By using simple instructions, subjects were not required to focus on either specific stimuli or on specific cognitive processes to which they were not attending. As a result, it is highly probable that individuals were easily able to focus most of their attention and mental effort on effectively solving problems and making decisions (Ericsson, 1975; Ericsson & Simon, 1980). As noted by Dansereau and Gregg (1966), it also is possible that the process of verbalization helped individuals articulate their ideas and offset any negative effects that might have been due to its obtrusion.

Implications

The results of the study presented in this paper provide some additional evidence for the validity of the simultaneous verbal protocol. Based on an analysis of the data presented herein, and the conclusions drawn by Ericsson and Simon (1980), it may tentatively be suggested that the verbal protocol provides management and decision researchers with an accurate and unobtrusive methodology for studying individual (i.e., managerial) problem solving and decision making processes. Given that this methodology has received considerable use in the past, and that its use appears to be increasing, continued research specifically directed at establishing both its validity and its reliability is essential. This present research has attempted to address a major validity issue and to provide some impetus for future research.

Specific methodological research, however, still is needed in the following areas. First, replication of the results presented in this paper is critical. It must be established whether these results are an artifact of the particular sample used or whether they are valid for different groups (e.g., managers, accountants, engineers).

Second, research needs to be conducted to assess the validity of verbal protocols across a variety of managerial problem solving and decision making tasks (e.g., simple and complex). There still remains some question whether this methodology is able to capture, accurately, conscious thought processes for all types of tasks (Ericsson & Simon, 1980; Payne et al., 1978; Smith & Miller, 1978).

Third, research is needed to investigate various ways in which thought processes might be elicited from subjects. Although many management and decision researchers have made use of simple "think aloud" instructions, no empirical research has been conducted to assess directly the relative efficacy (i.e., the ability to provide accurate, reliable, detailed and unobtrusive maps of problem solving and decision making processes) of other possible methods (e.g., experimenter prompting of subjects) that are available for eliciting simultaneous verbal protocols.

Finally, if management researchers are to gain a complete understanding of managerial problem solving and decision making processes, it is critical that they investigate these processes under a variety of environmental conditions (e.g., time pressure, noise, distractions) that appear to pervade managerial work (Mintzberg, Raisinghani, & Théorêt, 1976).

In summation, the simultaneous verbal protocol has the potential to be a viable and valuable methodology for studying managerial problem solving and decision making. However, it is critical that the line of research suggested in this paper and by Ericsson and Simon (1980) be pursued so that management and decision researchers fully understand both the benefits and limitations of this methodology.

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Erratum

The article "Administrative Turnover as a Response to Unmanaged Organizational Interdependence" by Gerald Salancik, Barry Staw, and Louis Pondy in Volume 23 (1980) contains an apparent calculation error in the discussion of Table 3 (pages 430-431). The difference of correlations of turnover and paradigm development between high and low resource interdependent departments was reported to be significant ($Z = 1.98$, $p < .05$). This should be corrected to read $Z = 1.402$, $p > .05$. Similarly, the difference of correlations of turnover and paradigm development between high and low task interdependent departments was reported to be significant ($Z = 2.14$, $p < .05$). This should be corrected to read $Z = 1.503$, $p > .05$.

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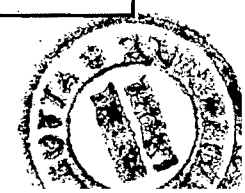
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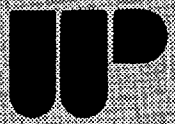
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Contents

Volume 26, Number 2, June 1983

213 An Empirical Typology of Mature Industrial-Product Environments
Donald C. Hambrick

231 Turnaround Strategies for Mature Industrial-Product Business Units
Donald C. Hambrick and Steven M. Schecter

249 An Examination of Level and Direction of Effort and Job Performance
Ralph Katerberg and Gary J. Blau

258 Coping with New Jobs: A Comparative Study of New Hires and Job Changers
Daniel C. Feldman and Jeanne M. Brett

273 The Interaction of Job Stress and Social Support: A Strong Inference Investigation
Anson Seers, Gail W. McGee, Timothy T. Serey, and George B. Graen

285 Causal Attributions, Affect, and Expectations for a Day's Work Performance
Joseph F. Porac, Gerald R. Ferris, and Donald B. Fedor

297 Shift Work Schedules and Their Relationship to Health, Adaptation, Satisfaction, and Turnover Intention
Sheldon Zedeck, Susan E. Jackson, and Elizabeth Summers

311 Strategic Power Relationships in Contemporary Profit and Nonprofit Hospitals
William B. Carper and Robert J. Litschert

321 Social Desirability Response Effects: Three Alternative Models
Daniel C. Ganster, Harry W. Hennessey, and Fred Luthans

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RESEARCH NOTES

332 Organizational Cosmopolitanism and Innovativeness
Thomas S. Robertson and Yoram Wind

339 Evaluation of Job Analysis Methods by Experienced Job Analysts
Edward L. Levine, Ronald A. Ash, Hardy Hall, and Frank Sistrunk

348 Sex Differences in Job Satisfaction Revisited
Philip E. Varca, Garnett Stokes Shaffer, and Cynthia D. McCauley

353 A Test of the Social Isolation of Male Tokens
Gail Theus Fairhurst and B. Kay Snavely

362 R&D Work Climate and Innovation in Semiconductors
Augustus Abbey and John W. Dickson

368 A Measure of Styles of Handling Interpersonal Conflict
M. Afzalur Rahim

377 **STYLE GUIDE**

379 **ANNOUNCEMENTS**

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An Empirical Typology of Mature Industrial-Product Environments[1]

DONALD C. HAMBRICK
Columbia University

This paper pursues the goal of parsimony by presenting a typology of mature industrial-product environments, derived from the PIMS data base. Cluster analysis yields eight environmental types that are discussed and tested for reliability in a holdout sample. The ultimate goal is to develop a contingency approach to business-level strategy.

Business-level strategy addresses the question of how to compete in a business. Research on the topic has been stymied somewhat because two identical strategic contexts never occur. As a result, two views have tended to dominate the literature on business-level strategy. First is the situational view, in which strategy is seen as artful alignment of environmental opportunities and threats, internal strengths and weaknesses, and managerial values (Andrews, 1971; Uyterhoeven, Ackerman, & Rosenblum, 1973). The tendency has been for proponents of this view to conduct in-depth case research. However, some quantitative research also has been aimed at demonstrating that strategic generalizations beyond one or two firms can be risky (Hatten, Schendel, & Cooper, 1978). The second—and quite opposite—view is that universal laws of strategy exist and that they hold to some extent for all settings. Examples are the "laws" of market share (Buzzell, Gale, & Sultan, 1975) and cumulative experience (Henderson, 1979).

What is missing are midrange theories. It should be possible to identify commonly recurring "settings" and to observe how different strategies tend to fare in each setting. Some theorists have attempted to establish such settings through product life cycle theory, arguing that certain types of strategies are appropriate at each life cycle stage (Hofer, 1975; Porter, 1980).

[1]The author gratefully acknowledges generous support from the Strategy Research Center of Columbia University Graduate School of Business and from the Strategic Planning Institute, Cambridge, Mass. The paper benefited from suggestions by the following people: Richard Bettis, Diana Day, Lawrence Dyer, Bradley Gale, Kathryn Harrigan, Thomas Lenz, Ian MacMillan, William Newman, Johannes Pennings, and Sidney Schoeffler.

With limited exception (MacMillan, Hambrick, & Day, 1982), such prescriptions have not been put to empirical test. Another somewhat coarse-grained contingency approach is based on market share. Several papers have been written about appropriate strategies for high-share (Bloom & Kotler, 1975) and low-share businesses (Hamermesh, Anderson, & Harris, 1978; Woo & Cooper, 1980). These are important contributions, but they reside relatively close to the "universal" end of the "situational-to-universal" continuum.

The purpose of the present paper is to develop a more medium-grain typology of settings, or environments, in which strategies can be examined. The emphasis is on empirically identifying types of environments that appear with great frequency on the organizational landscape. The research project is inductive—an attempt to build theory rather than to test theory.

Since a medium-grain typology is the aim, the domain to be typed must be somewhat circumscribed. Accordingly, the paper presents a typology of only mature industrial-product environments. These industries are of major significance both in terms of their relative numbers on the American economic scene and the resources they control. Although the domain of this inquiry is limited, one of the goals of the paper is to demonstrate how typology-building might proceed for growth, consumer-product, service, and even the not-for-profit sectors.

This paper reports on the development of a typology of environments, but the aim of the overall research project goes much further. A companion paper demonstrates the real significance of the typology by reporting strong evidence that different strategies are associated with high profit performance in each type of environment (Hambrick, in press).

The reliance on typologies in scientific inquiry rests on this premise: *Phenomena of interest do not occur in infinite combinations, at least not with equal likelihood.* Typologies are devices for achieving parsimony. The biological sciences have long relied on taxonomies. The distinction between "typology" and "taxonomy" is sometimes taken as the difference between conceptually-derived and empirically-derived schemes (Sneath & Sokal, 1973). However, this is far from a universal distinction (McKelvey, 1975). For the sake of convenience, the term "typology" is used here to mean any classification scheme. In the organizational literature, typologies of organizations (Blau & Scott, 1962; Etzioni, 1961), environments (Duncan, 1972; Emery & Trist, 1965), and strategies (Miles & Snow, 1978; Miller & Friesen, 1977, 1980) have been set forth.

In addition to reducing the vast array of combinations a researcher must consider, a typology has the attraction of allowing the construction of gestalts (Miller & Friesen, 1977). Each type (within a typology) represents a holistic package of attributes. Once identified, each type can be tested and extended by future researchers, all of whom have their preferred sets of variables for viewing organizations. Thus, types serve as a useful basis for further research. More to the point of strategy formulation, a typology of environments fosters a contingency view of strategy that goes beyond adherence to one-dimensional contexts (e.g., product life cycle) or non-generalizable contexts (e.g., SIC codes).

Finally, typologies have important pedagogic usefulness. It is hoped that the typology offered in this paper will contribute to a "shorthand" for academics, executives, and students of strategy.

The field of business policy deals to a great extent with the alignment of the organization with its environment, but the literature offers little concrete guidance as to which dimensions might be most important in developing a typology of mature industrial-product environments. If the present study had not already narrowed down to only mature businesses, it is clear from the literature that life cycle would be included as a dimension. Hofer (1975) provides additional ideas about which environmental variables might be important in formulating strategy for mature businesses. His list of 15 dimensions appears reasonable, but it has three limitations. First, it is a speculative list based on Hofer's intellectual synthesis of previous literature and his own seasoned observations. Second, some of the dimensions would be difficult to operationalize (e.g., "market segmentation" and "number of equal products"). Third, it is economically infeasible to gather the data Hofer calls for on a scale that might allow meaningful research.

Other fields—notably industrial economics and organization theory—are interested in organizational environments and might provide some guidance. In industrial economics, relevant environmental dimensions include concentration ratios, barriers to entry, product differentiation, importance to customers, and so on. However, with limited and important exception (Harrigan, 1980; Porter, 1980), these dimensions have been developed and applied to study public policy issues, not to aid in strategy formulation. Similarly, in organization theory, the environmental concepts of uncertainty, dynamism, homogeneity, munificence, and complexity are established. They are summarized in Ford and Slocum (1977). But these variables have been used primarily to predict organizational structure and process, not strategy. So, even though these two fields have rich concepts of environments, their applicability to strategy formulation is not clear.

If a data base were being developed for this research project, there clearly would be a problem deciding which variables to include. However, an existing data base—the Profit Impact of Market Strategies (PIMS) data base—is being used, so no decisions need to be made about what data to collect. But the reverse problem exists: namely, there are relevant environmental variables (e.g., industry capital intensity, advertising intensity, and regulatory pressures) that are not in the data base. Still, the data base is quite rich with environmental variables and probably can be considered an unequalled vehicle for large scale study of business-level strategy. The many environmental variables available in the data base allow the achievement, in spirit, of a key guideline McKelvey (1975) laid out for typological researchers: include as many "typing" dimensions as is possible so as to minimize the likelihood of masking important differences among the objects being typed.

General Approach

There were several discrete phases to this study, listed here as an overview:

1. Classify PIMS variables into environmental and nonenvironmental.

2. Using factor analysis, reduce the array of environmental variables to a manageable, meaningful set (10 environmental dimensions were determined).
3. Using cluster analysis on environmental characteristics of 300 mature industrial-product businesses, identify frequently occurring environments, the most densely populated regions in the 10-dimensional space (8 clusters were identified and are discussed).
4. Using the cluster profiles as a guide, establish tighter "definitional" boundaries for the eight environments. Attempt to assign each of the 770 mature industrial-product businesses in the data base (including the above 300) to one of the 8 environments (640 businesses, 83 percent, were so assigned).

A companion paper reports on additional steps aimed at studying relationships between strategy and performance in the different environments (Hambrick, in press).

Methodology and Analysis

PIMS Data

The data in this study were drawn from the PIMS project, an ongoing, large scale statistical study of environmental, strategic, and performance variables for individual business units. About 200 corporations submit data annually on a total of about 2,000 of their business units. Each business, often a division, is a distinct product-market unit. (For a technical summary of the PIMS data base, see Schoeffler, 1977.)

Anderson and Paine (1978) provided a comprehensive critical review of the PIMS data base. Most of their concerns were about the ways in which PIMS data had been statistically analyzed and presented in previous studies. Although they raised limited concerns about the quality of the data, they generally acknowledged the data base to be of high quality and reliability. Hambrick, MacMillan, and Day (1982) noted a variety of factors that suggest a relatively high degree of reliability in the data base.

A limitation of great importance to this study is that the businesses in the data base cannot be viewed as typical of business units in general. On average, the participating businesses probably are more sophisticated, more dominant within their markets, and more effective than the total population of business units in the United States. Also, because of security provisions, there can be no way of knowing whether the industries represented in the data base are a fair reflection of the actual mix of businesses on the economic landscape.

The study was based on PIMS data for businesses that (a) manufacture industrial products and (b) are in the mature stage of the product life cycle (described in the PIMS questionnaire as an industry with demand growing at less than 10 percent annually in real terms; products familiar to a vast majority of prospective users; technology and competitive structure

reasonably stable). Businesses in the decline stage were not included in the study. A total of 770 mature industrial-product businesses are in the data base.

All statistical analyses were conducted using the software package, Analysis of Quantitative Data (Schlaifer, 1978).

Identifying Environmental Variables

There are more than 100 variables in the PIMS data base. As a first step, then, it was important to identify those that are environmental. This was done with the aid of a mail panel of 15 individuals (academics, consultants, and executives) who have strong familiarity with the PIMS program and strategy formulation. The aim was not to obtain statistically reliable indicators of whether each variable was environmental, but rather to supplement the author's own judgment and protect against important omissions or misclassifications. (The panel's assessments can be obtained by writing to the author.)

A total of 28 environmental variables were identified. However, several were determined to have weak scales or very restricted distribution of responses. These items were dropped from further consideration, leaving 19 environmental variables.

Reducing the Variables to a Manageable Set

An examination of zero-order correlations among the 19 environmental variables revealed a number of intercorrelations, indicating an underlying structure. Because of this, and a preference for parsimony, the variables were factor analyzed ($N = 400$, a random sample). Several factoring variations closely mirrored the results obtained through varimax rotation and orthogonal factoring, the approach settled on. Eigenvalues over 1 were found for 10 factors, and these factors accounted for 67 percent of the communality among the 19 variables (results are available from the author).

The factor analysis, then, suggested that 10 environmental dimensions exist in the data. The first seven consist of multiple items:

1. Industry concentration (CONCENT) consists of three variables: market share held by largest three competitors (factor loading = .84); market share held by largest four competitors (.56); number of competitors (−.73).
2. Infrequency of customer's purchase (INFREQ): by immediate customers (.93); by end users (.71).
3. Dollar importance of product to customers ($IMPORTANCE): importance (percent of all $ purchases) to immediate customers (.84); to end users (.89).
4. Product dynamism (PDTDYN): percent of industry sales from new products (.66); age of product category (.44); recency of major technological change in the industry (.33).

5. Cost pressure (COSTPRESS): raw material cost growth rate (.50); labor cost growth rate (.61).
6. Product sophistication (PDTSOPH): need for follow-up service (.57); professional advisors (e.g., architects, engineers) involved in purchase (.65).
7. Industry vulnerability (VULNER): imports (.71); industry value added per employee (-.40).

The remaining three variables did not load strongly with any other variables, so they were retained as 1-item dimensions;

8. Exports (EXPORTS): percent of domestic production exported.
9. Demand instability (DEM INSTAB): 10-year variability (from trend line) in primary demand.
10. Market share instability (SHARE INSTAB): 4-year variability in market share of four leading competitors.

The scores of all 19 underlying variables were standardized as z-values (mean = 0; s.d. = 1). Multi-item dimensions were constructed by weighting the member variables by their factor score coefficients.

It is useful to draw conceptual bridges between fields. Table 1 portrays points of similarity between the 10 dimensions and environmental concepts from the fields of industrial economics and organization theory. Obviously, the linkages to these two areas are not exhaustive. For example, a thorough reconciliation with industrial economics would address price elasticity and barriers to entry. The table still serves as a rough aid in translation across fields.

The last column of Table 1 represents an attempt to synthesize the environmental dimensions in the terms recently set forth by Lawrence (1981) and Lawrence and Dyer (1981). In an effort to achieve parsimony in the description of business environments, Lawrence established a framework with two rather robust dimensions—strategic uncertainty and resource tension. Strategic uncertainty, or simply *uncertainty*, is a function of several things: number of competitive variations, array and variability of customer preferences, amount of information being generated in the task environment, ignorance about cause/effect relationships, numbers of relevant environmental variables, and the interdependence of variables. *Resource tension* roughly equates with life cycle stage (the later the stage, the greater the tension), but it can be affected by raw material scarcities, customer impacts, competitive intensity, and government factors. Lawrence used this two-dimension framework to integrate disparate literatures: industrial economics, population biology, Miles and Snow's (1978) typology, Mintzberg's (1979) typology, and his own earlier work (Lawrence & Lorsch, 1967). Naturally, a two-dimensional framework runs the risk of oversimplifying, but it also can be an important aid to parsimony and integration.

Identifying Environmental Types

A major part of this project was to identify common types of industrial-product environments. To do this, cluster analysis was used to identify

Table 1
The Environmental Dimensions: Linkages to Other Fields

	Industrial Economics (Porter, 1980; Scherer, 1980)	*Organization Theory (Duncan, 1972; Ford & Slocum, 1977)*	*Lawrence's Synthesis (Lawrence, 1981; Lawrence & Dyer, 1981)*
Concentration	Concentrated industries tend to be less rivalrous than fragmented industries, because strong leaders often exist and market signalling can be relatively efficient.	Concentrated industries can be considered more homogeneous than fragmented industries.	Concentrated industries have relatively low uncertainty.
Infrequency of purchase	The customer's bargaining power may be relatively low when the product is infrequently purchased, because the customer has limited knowledge of the seller's cost structure and so on.		An infrequently purchased product creates resource tension for the seller, because sales patterns are not smooth and there can be long gaps between major sales.
Dollar importance	The customer will tend to exercise strong bargaining power when the product has great dollar importance to him.		The customer's tendency to bargain for a product of great dollar importance creates resource tension for the seller.
Product dynamism	Product dynamism creates the opportunity for product differentiation.	Product dynamism is, of course, associated with environmental dynamism, as well as uncertainty.	Product dynamism creates uncertainty.
Cost pressure		Cost pressure restricts the munificence of the environment.	Cost pressure creates resource tension.
Product sophistication	Product sophistication creates the opportunity for product differentiation via service, warranties, and so on.	Product sophistication creates environmental complexity as sellers and customers strive to cope with the requirements of the product.	Product sophistication creates uncertainty.
Vulnerability	Industry vulnerability is associated with degree of competitive rivalry.	Industry vulnerability restricts munificence and tends to increase environmental heterogeneity.	Industry vulnerability primarily creates resource tension through increased competition.
Exports	Industry exports can serve to lessen rivalry, because there are multiple competitive arenas.	Industry exports can increase munificence; more importantly, exports increase environmental heterogeneity.	Industry exports primarily create uncertainty, because multiple and varied competitive arenas must (or can) be monitored.
Demand instability	Demand instability induces rivalry, because fixed costs must be covered during slow times and sales are crucial during abundant times.		Depending on whether demand is unstable in an erratic pattern or in a regular cyclic pattern, there may or may not be uncertainty. Demand stability, however, almost certainly creates resource tension via intense rivalry and periods of low sales.
Market share instability	Market share instability is itself an indicator of rivalry.	Market share instability indicates dynamism and, possibly, restricted munificence as competitors fight hard for share.	Market share instability suggests both uncertainty and resource tension.

densely populated regions of the 10-dimensional space. Cluster analysis is a family of techniques that allows the researcher systematically to identify similar objects—in this case business environments. (See Frank and Green, 1968, and Morrison, 1967, for discussion.) Because of software limitations, a random sample of only 300 observations was used in the cluster analysis.

The algorithm used begins by considering each object—an environment—as a distinct cluster. Calculated for each pair of clusters are 10-dimensional Euclidean distances. The two closest clusters are combined into a new cluster. This "minimum squared error" grouping process continues until all objects are combined into one cluster. This process tends to produce more "spherical" clusters (and, hence, very different but usually more interpretable clusters) than do other approaches (e.g., nearest neighbor or farthest neighbor).

The researcher has the problem of deciding how many clusters (between 1 and n) provide the most meaningful portrayal of the data. The rule of thumb is to look for a pronounced increase in the "tightness" (mean squared error) of the clusters as the algorithm moves from, say, a 10-cluster to a 9-cluster solution. In this study, the data yielded only steady increments for all solutions below the 20-cluster level. This suggests that strong "natural" clusters may not exist and that a different set of data might yield somewhat different clusters (to be discussed further below). Additional guidance regarding the appropriate number of clusters comes from Lehmann (1979), who states that there generally is no way to get more than $n/30$ to $n/50$ reliable clusters from survey data (i.e., 6 to 10 clusters for this study). Examination of all clusters between the 2-cluster and the 10-cluster solution led to the conclusion that the 8-cluster level provided the best tradeoff between parsimony and detail (details of the hierarchical splitting through the 8-cluster solution are available from the author).

The characteristics of the eight clusters are presented in Table 2 in terms of the mean scores of the cluster members on the 10 environmental dimensions used to form the clusters. Indications of statistical significance are given to aid interpretation of the distinguishing characteristics of each cluster. The indications of significance should not be taken as any kind of "test." It hardly makes sense to divide data into discrete groups and then test to see if they are different. It can be noted that discriminant analysis of the eight clusters yields a model that accurately predicts over 90 percent of the members of each cluster.

Extending to a Larger Sample

The next step in the project was to extend the classification scheme to all 770 mature industrial-product businesses in the data base. The primary reason for doing this was to enhance the sample sizes for eventual analysis of strategic attributes.

An attempt to extend the clusters to a broader sample also provides a test of the reliability of the clusters. The most direct such test would be

Table 2
Profiles of Eight Clusters of Mature Industrial-Product Environments[a]

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Industry concentration	−.08	.08	.24	.23	−1.41*	−1.23*	.31*	.29*
	(.83)	(.78)	(.76)	(.62)	(.59)	(.55)	(.66)	(.71)
Infrequency of customer's purchases	−.08	.92*	1.17*	−.27	−.24	−.43*	−.63*	−.69*
	(.93)	(.62)	(.81)	(.49)	(.75)	(.46)	(.56)	(.56)
Dollar importance of product to customers	.33	−.21	−.29	−.21	.01	−.24	−.06	.33
	(.01)	(.75)	(.98)	(.90)	(.84)	(.90)	(.86)	(.88)
Product dynamism	−.31*	−.05	.65*	−.24	.07	−.11	−.17	−.27*
	(.38)	(.52)	(.72)	(.38)	(.53)	(.41)	(.41)	(.33)
Cost pressure	.13	−.04	.01	−.09	−.05	−.04	−.02	−.03
	(.66)	(.68)	(.69)	(.52)	(.54)	(.55)	(.59)	(.67)
Product sophistication	.17	.15	.34*	−.04	−.12	−.22	−.06	.08
	(.60)	(.73)	(.59)	(.62)	(.74)	(.55)	(.62)	(.59)
Industry vulnerability	−.11	.07	.43*	−.41*	−.19	−.31*	.03	.13
	(.20)	(.71)	(.78)	(.34)	(.46)	(.21)	(.55)	(.82)
Exports	.21	.47*	.80*	−1.71*	−.32*	−.88*	.46*	−.29
	(.51)	(.64)	(.74)	(.44)	(.84)	(.75)	(.61)	(1.02)
Demand instability	2.42*	−.19	.01	−.21	−.88*	−.23	−.46*	−.16
	(.14)	(.50)	(.49)	(.50)	(1.21)	(.50)	(.56)	(.61)
Share instability	.21	−.78*	.85*	.88*	.68*	−1.10*	.43*	−1.16*
	(1.00)	(.66)	(.54)	(.45)	(.61)	(.48)	(.63)	(.56)
N	24	39	50	24	26	26	59	49

[a]Means reported; standard deviations in parentheses.
*Significance of difference from overall sample mean (t test), $p < .05$.

to do cluster analysis on a holdout sample and see if the same clusters appear as in the initial sample. This was conducted, and the result was that at the 8-cluster level three close counterparts of the eight clusters were observed. In inspecting adjacent solutions (7-cluster through 10-cluster solutions), counterparts for all eight were found. This lack of reproducibility at exactly the 8-cluster level was to be expected because, as noted, the initial choice of an 8-cluster solution was somewhat arbitrary: there was no indication of the absolute "correctness" of an 8-cluster solution. This suggests a reiteration of the caveat that the study may not have uncovered eight definitive or "natural" categories of industrial-product businesses. However, given the two-sample inspection, one could conclude that any other categorization scheme would differ from this one only in its level of aggregation—not in its fundamental character.

The approach for assigning all 770 businesses to the 8 environments was to develop 10-dimensional boundaries. This is a variation of Miller and Friesen's (1977, 1980) concept of archetype boundaries. The study proceeded from two premises: (1) the clusters provided preliminary insight into eight common configurations in the 10-dimensional space and (2) visual inspection of the cluster distributions would allow identification of relatively tight specific boundaries for each of eight environmental types. (The term "cluster" will refer to the output of the cluster analysis; the term "environment" or "type" will refer to the environment defined by the visually-determined boundaries.)

The reason that boundaries cannot be meaningfully established directly from the cluster output is that each cluster has "outliers" that protract its absolute boundaries. For example, an observation could lie very close to the centroid of a cluster on nine dimensions—and thus qualify for membership in that cluster—but lie far afield from the rest of the cluster on the tenth dimension. When this problem is multiplied by the many members of each cluster, it becomes clear that cluster boundaries can be broad indeed.

The boundaries were deliberately established so as to be mutually exclusive, that is, no business can belong to more than one type. Basically, if a cluster's membership had a mean score on an environmental dimension that was significantly different from the mean for all businesses in the study (i.e., zero, because the scores were standardized), then a boundary was set. For example, if a cluster scored significantly above average on product dynamism, then a lower boundary of zero would be set and only businesses whose environments scored above zero could be considered for membership in the setting.

The price of drawing relatively tight boundaries is that the eight types will encompass somewhat less than 100 percent of all observations. The benefit is that each type consists of a more homogenous set of observations than does each initial cluster.

Table 3 reports the composition of the eight types of environments. A key conclusion from Table 3 is that the sample of 470 businesses not used in the initial clustering fits into the eight environmental boundaries in proportions strikingly similar to the 300 businesses that were used in the clustering. In all, 640 of the 770 businesses (83 percent) were assigned to the eight types. Thus has been developed a typing scheme that captures the essence of more than three-fourths of the mature industrial-product environments in the PIMS data base.

Table 3
Composition of the Eight Environmental Types

	Environment								
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*Total*
Number assigned from original cluster	20	36	39	20	22	23	55	45	260
Number assigned from "holdout" sample ($n=470$)	16	71	18	15	60	25	45	104	380
Total	36	107	57	35	82	48	90	149	640
Percent assigned from sample used for clustering ($n=300$)	7	12	13	7	8	8	18	15	87
Percent assigned from holdout sample ($n=470$)	3	15	4	3	13	5	10	22	81

The Settings

Table 4 summarizes the characteristics of the eight types of settings, with denotations of "defining characteristics" (resulting from the boundaries described above) and "accompanying tendencies" (characteristics that differ

Table 4
Profiles of the Eight Settings

Setting	*Distinguishing Characteristics*[a]	*Examples*	*Mean ROI*
#1: Roller-coaster commodities ($n=36$)	Product dynamism − (D) Demand instability + (D)	Steel Aluminum Plywood Fertilizer	19
#2: Disciplined capital goods makers ($n=107$)	Infrequency + (D) Exports + (D) Share instability − (D)	Steam turbines Railway equipment Rolling mill machinery Power transmission equipment	22
#3: Aggressive makers of complex capital goods ($n=57$)	Infrequency + (D) Product dynamism + (D) Product sophistication + (D) Vulnerability + (D) Exports + (D) Share instability + (D) Concentration + (A)	Construction machinery Textile machinery Paper machinery Printing machinery TV transmission equipment	23
#4: Closeted combatants ($n=35$)	Vulnerability − (D) Exports − (D) Share instability + (D)	Ready-mixed concrete Industrial gases Lubricating oils Secondary steel smelting Steel finishing	26
#5: Unruly mob ($n=82$)	Concentration − (D) Exports − (D) Demand instability − (D) Share instability + (D) Infrequency − (A) Vulnerability − (A)	Adhesives Valves/pipes Electrical components Hand tools Conveyer parts	20
#6: Passive crowd of provisioners ($n=48$)	Concentration − (D) Infrequency − (D) Vulnerability − (D) Exports − (D) Share instability − (D) Product dynamism − (A) Product sophistication − (A)	Paperboard boxes Paints/varnishes Paper food containers Nonferrous wire Carbon paper/inked ribbons	21
#7: Aggressive makers of stable feedstocks and supplies ($n=90$)	Concentration + (D) Infrequency − (D) Exports + (D) Demand instability − (D) Share instability + (D)	Dyes/pigments Rubber hoses/belting Small pumps Photographic supplies Small motors/generators	27
#8: Orderly producers of mundane supplies ($n=149$)	Concentration + (D) Infrequency − (D) Product dynamism − (D) Share instability − (D)	Explosives Glass containers Abrasives Saws/blades	26

[a] + and − indicate direction of significant difference from overall mean; (D) indicates that the variable is a "defining characteristic" of the setting; (A) indicates an "accompanying tendency."

significantly from the grand mean did not emerge as significant in the initial clustering of 300 businesses). As an analogy, hormonal makeup and sex organs are "defining characteristics" of the sexes, whereas height and weight are "accompanying tendencies."

Table 4 also portrays examples of industries (or sectors within industries) that are members of each type of setting. Roughly half the examples are actual industries represented in the data base and half are based on interviews with executives, industry experts, and industry studies.

#1: Roller-Coaster Commodities

This setting is characterized primarily by very high instability in primary demand and low product dynamism. Apparently these commodity-like industries are particularly subject to swings in economic conditions and other demand factors. It could be expected that major sectors of the steel, aluminum, fertilizer, bulk chemicals, and building materials industries are among these roller-coaster commodities.

#2: Disciplined Capital Goods Makers

This type of setting has three defining characteristics: a very infrequently purchased product, above average exports, and stable market shares. Although some nondurables might have these characteristics, the combination of purchase infrequency and high exports particularly suggests that capital goods industries populate this type. The stable shares suggest a very orderly industry. This need not suggest that collusion is occurring, only that members' roles within the industry are well understood and there is little boat-rocking (Porter, 1980). One would expect certain sectors of the machine tool, power transmission equipment, rolling mill machinery, and railway equipment industries to be characterized as disciplined capital goods makers.

#3: Aggressive Makers of Complex Capital Goods

This type of setting shares some characteristics with #2—infrequently purchased products and high export levels. But it differs from #2 in important ways: Product dynamism is high, product sophistication is high, vulnerability is high, and market shares are quite unstable. These are capital goods industries whose product is complex—possibly with many moving parts, requiring highly skilled operators—and of key importance to the customer's productivity. It is likely that there is ongoing upgrading of the efficiency, flexibility, and serviceability of these products. Major breakthroughs on any of these fronts can occur relatively frequently. Hence market shares are volatile. Parts of the construction machinery, textile machinery, printing machinery, and paper machinery industries can be considered aggressive makers of complex capital goods.

#4: Closeted (Localized) Combatants

Certain types of industries are characterized primarily by their geographical bounds (very low exports and low import vulnerability) and their combativeness among themselves. Such industries probably make products that have very high shipping costs (relative to value added), are perishable, or are physically volatile. Ready-mixed concrete, industrial gases, recycled

lubricating oils, and secondary (scrap) steel smelting are among the industries that could be considered closeted (localized) combatants.

#5: Unruly Mob

This setting is the first in which industry concentration appears as a defining characteristic. In addition to very low concentration, this setting has low exports, relatively stable demand, and very unstable market shares. Frequent purchase and low vulnerability are accompanying tendencies. The share-fighting that goes on here may be a result of the mirage of steady profits (stemming from steady demand) and of the fragmented nature of the industry, which leaves it without strong leaders who can impose order. Certain parts of the adhesives, valves, electrical components, and hand tool industries are expected to be unruly mobs.

#6: Passive Crowd of Provisioners

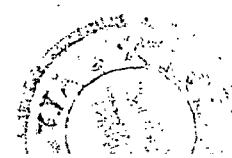
This setting has several distinguishing tendencies: very low industry concentration, infrequency of purchased products, low vulnerability, low exports, and very stable market shares. Product dynamism and product sophistication also tend to be low. The low export levels and stable shares suggest some passivity in these fragmented industries. Each of such industries as paperboard boxes, paper food containers, paints, and office supplies is expected to be a passive crowd of provisioners.

#7: Aggressive Makers of Stable Feedstocks and Supplies

This is the only setting in which the product is both frequently purchased and heavily exported. This suggests that the products may be both supplies and higher value-added feedstocks and components. This setting also is characterized by high concentration, relatively stable demand, and unstable market share. The products probably are used in a broad array of end products, causing overall demand to be stable. Dyes and pigments, rubber belts and hoses, small pumps, photographic supplies, small motors/generators, and some chemical feedstocks are expected to be characterized as aggressive makers of stable feedstocks and supplies.

#8: Orderly Producers of Mundane Supplies

This type of setting has four defining characteristics: high concentration, frequently purchased products, low product dynamism, and stable shares. These apparently are nonglamorous industries in which very little upstart behavior occurs. Parts of the explosives, glass container, abrasives, and ball bearing industries probably could be considered orderly producers of mundane supplies.

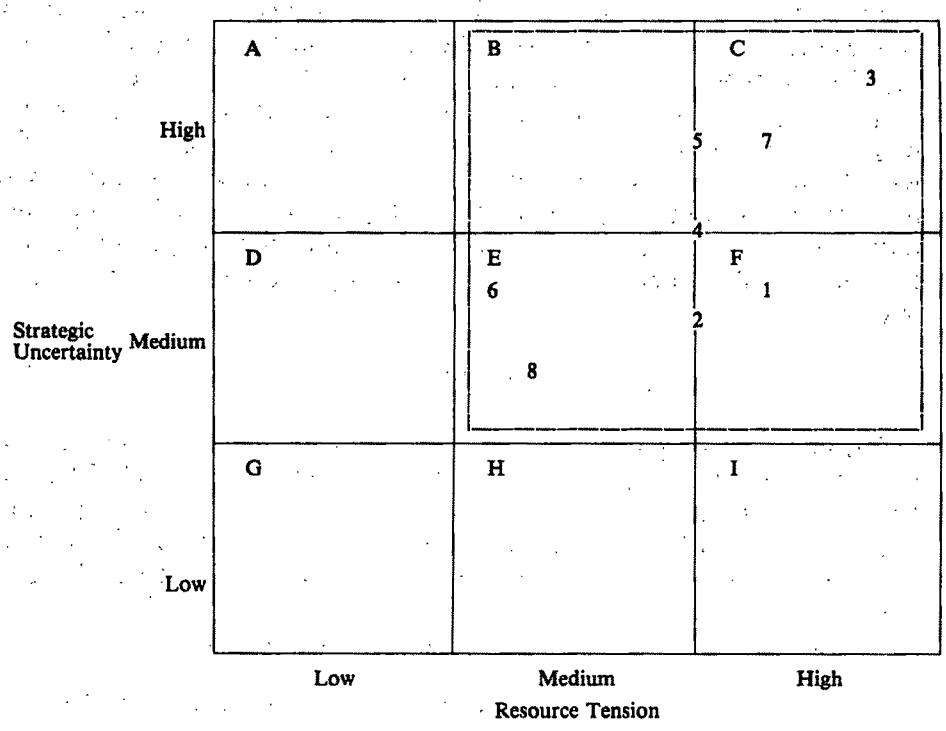


Reconciliation with Lawrence

The question arises as to what can be made of these eight environmental types. Because the major aim of the study is to contribute to a contingency view of business-level strategy, the primary answer must await the companion paper in which the effectiveness of various strategies is assessed for the different environments.

It is instructive, however, to map the eight environments on the Lawrence (1981) framework, discussed earlier. Lawrence characterized business settings on two dimensions: uncertainty and resource tension. This led to a 9-cell matrix, portrayed as Figure 1 with letters denoting the various cells. Cells G, H, and I are various forms of monopolies, according to Lawrence. (Bear in mind that Lawrence intended his framework to apply to nonprofit sectors, for example, government agencies, schools, and hospitals, as well as to businesses.) Cells A, D, and G consist primarily of organizations in the early life cycle stages. Thus, the present study of mature industrial-product industries can be construed to fit roughly into the northeast region

Figure 1
Lawrence's Framework for Viewing Environment and Organizations[a]



[a]Numbers refer to the eight types of environments derived in this paper.

of the matrix, that is, cells B, C, E, and F (bordered with a broken line in Figure 1).

Lawrence tried to estimate where some specific industries might fall in the matrix, but he noted the limitations of drawing on his impressions and of trying to "fix" a specific industry in a given spot, because industries tend to evolve. In the present study, the mapping of the eight generic industry types into the matrix makes no pretense of precision. Rather, it is an attempt to flesh-out part of the Lawrence matrix and to relate broadly the eight types to each other.

Assume that the intersection of the four cells (B, C, E, F) is in fact the center of the terrain with which this study has dealt. If so, all eight environmental types could be located with reference to that center. Further assume that each distinguishing feature of an environmental type (summarized in Table 4) warrants a one-unit increment (or decrement) on either the uncertainty or resource tension dimension, depending on how that feature was classified in Table 1. As an example, take the case of environment #1—roller-coaster commodities. Its negative score on product dynamism warrants a one-unit decrement from center on the uncertainty dimension; its positive score on demand instability warrants a one-unit increment from center on the resource tension dimension. All eight environments can be similarly scored and located, as in Figure 1.

Again, there is no pretense at precision. The scaling assumptions are many and arbitrary. Still, it appears that the environmental types can be meaningfully arrayed on Lawrence's matrix and that their *relative* positions are roughly as they have been portrayed. From here, researchers should be able to go on to test whether, for example, types 3 and 8 differ in some of the ways Lawrence theorized: proportions of Miles and Snow's strategic types, proportions of Mintzberg's organizational types, direction of error in misperceiving the environment, and so on. There are ample opportunities for bridges to be drawn between the typology suggested here and Lawrence's matrix.

Summary

The intent of this paper has been to contribute to parsimony in the field of strategy by deriving a concise typology of settings in which different strategies eventually could be tested for their effectiveness. Using PIMS data, eight types of mature industrial-product settings were empirically derived, embracing 83 percent of the settings for such businesses in the data base.

It would be especially useful if an underlying logic could be extracted from Table 4. Do any "laws" of industry forces emerge? Is there any symmetry across the eight environments? These happen to be eight common settings and any attempt to specify why they exist as they do becomes quickly strained, but a few patterns warrant noting.

Two environmental dimensions—dollar importance and cost pressures—did not appear as distinguishing characteristics of any of the settings. Future tests or refinements of the typology might exclude these dimensions.

When demand instability and share instability appear together (Types 5 and 7) they have opposite signs. Apparently the lure of steady profits in an industry with stable primary demand induces severe share-fighting.

When product dynamism and share instability both appear (3, 6 and 8), they have like signs. It comes as no surprise that a changing product promotes unstable shares or that, conversely, an unchanging product creates market share rigidities.

Purchase infrequency and exports appear with like signs in four settings (2, 3, 5, and 6) and with opposite signs in one setting (7). It appears that capital goods are the most exportable from the United States. More frequently purchased supplies and feedstocks do not have the value added to compete after adding international shipping costs, or else they cannot be delivered internationally with the reliability and timeliness required. An apparent exception (7) is when primary demand is very stable and hence shipping schedules are less problematic.

Industry vulnerability (indicating imports) and exports have like signs when they appear together (3, 4, 5, and 6). Apparently some combination of product characteristics, demand, and industry custom causes industries to have an international dimension or not. When imports occur, exporting also is very active.

These few patterns need to be squared with theories of industry forces (e.g., Porter) and tested with other data sets. The study has limitations, two of which are especially notable. First, some important environmental variables were not available. These include industry capital intensity and advertising intensity. It remains unclear how these variables would have affected the derivation of the environments. Second, the choice of eight environments was somewhat arbitrary. A more coarse-grained typology of four or five environments, or a more fine-grained typology of, say, 12 or more environments, could have been presented. The mathematical patterns suggested that no number in the range of 2 to 20 presented superior "natural" or "stable" groupings.

This study is a first attempt at empirically classifying industries. Refinements and further tests are needed. One of the goals has been to provide a methodological example of how such research can proceed. It is hoped that similar studies, using other sources of data (e.g., Compustat) or other sectors (consumer products, service industries, etc.) will be stimulated. A cogent, concise typology of environments, or industries seems an important vehicle for the continuing progress toward a contingency view of strategy.

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Turnaround Strategies for Mature Industrial-Product Business Units[1]

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A study of short-term turnaround attempts by mature industrial-product business units found that efficiency-oriented moves, but not entrepreneurial initiatives, were associated with successful turnaround. Three common types of successful turnaround "gestalts" were found: asset/cost surgery, selective product/market pruning, and piecemeal moves.

There is an abundant folklore on how to revive poorly performing businesses, but systematic evidence about turnarounds is scant. Turnarounds are of increasing relevance. Global competition, technologial turbulence, high costs of capital, and other nettlesome factors will cause more and more businesses to face occasional hard times. Businesses in mature industries face particularly difficult turnaround situations. Demand is flat, customer loyalties are relatively strong, and competition generally is zero-sum.

The purpose of this study is to examine the short term turnaround attempts of a sample of poorly performing mature business units. (The short term limitation is imposed by the data.) There are three primary research questions:

1. In general, which strategic moves are associated with turnaround success?
2. Are there any combinations of strategic moves, that is, strategies, that are especially common routes back to profitability?
3. How do the operating and market positions of the business affect its choice of a turnaround strategy?

Naturally, the study does not address all facets of these questions. It is limited in its scope, on the premise that some systematic evidence—even if narrow—is what is needed now.

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Theoretical Foundation

Three important pilot studies on turnarounds served as the key antecedents of this project: Schendel, Patten, and Riggs (1975); Hofer (1980); and Bibeault (1982). Some of the specific points in these studies will be drawn on below, but it is useful to summarize the three here.

Schendel et al. (1975) studied 54 firms that, based on Compustat data, had suffered four consecutive years of earnings decline and then four consecutive years of earnings improvement. Using business periodicals, the authors subjectively rated the causes of the declines and the actions accounting for the upturns and classified each as either "strategic" or "operating" in nature. On the basis of their admittedly "soft data," the authors generally found support for their theory: that declines caused by operating problems (e.g., production bottlenecks, labor strife) tend to be followed by operating cures (e.g., new cost controls, plant modernization) and that declines caused by strategic factors (e.g., obsolete products, intense price competition) tend to be followed by strategic cures (e.g., new products, redefining the business).

Hofer (1980) similarly classified turnarounds as "strategic" or "operating": "strategic" basically was defined as a major redefinition of the firm and/or attempts to increase market share dramatically. By analyzing written cases on 12 poorly performing firms, he found support for his theory that the appropriateness of a strategic or operating turnaround depends on whether the firm's "illness" stems from poor strategy or poor operations. He also laid out a framework for choosing among different operating turnarounds according to the firm's closeness to breakeven, and here again he found some support. In particular, he found that firms operating close to breakeven tended to turn around successfully if they pursued cost-cutting strategies and that firms operating far below breakeven required more ambitious revenue-increasing or asset reduction strategies.

Bibeault (1982) conducted a survey of 81 chief executives who had faced turnaround situations. He coupled the data with anecdotes to discuss why failures occur, characteristics of successful and unsuccessful turnarounds, and leadership aspects of turnarounds. His book, written primarily for practitioners, emphasizes organizational and human issues, but it also provides some insight on formulating turnaround strategies. Some of these will be discussed in the theoretical subsections that follow.

Problems with "Strategic" Turnarounds

Schendel et al. and Hofer stressed the distinction between strategic and operating turnarounds. Roughly speaking, the difference is between "doing different things" and "doing things differently." As examples, Schendel et al. indicated plant expenditures, new emphasis on functional areas, and efficiency actions as operating cures; and diversification, vertical integration, and divestment as strategic cures. This dichotomy is not used in this

paper for two reasons. First, many of the specific actions considered as strategic by previous research (e.g., diversification, divestment, vertical integration) have only limited applicability at the business level—the focus of this study. One, of course, can conceive of strategic versus operating moves at the business level, but most available data would cause the dichotomy to be blurred. For example, improved cost controls and the purchase of new automated equipment might easily be taken as operational moves, but these could be the major actions taken by a firm to move more toward a "cost leadership" (Porter, 1980) or "defender" strategy (Miles & Snow, 1978).

The second misgiving with the strategic/operating dichotomy is that, as defined by Hofer, the strategic turnaround seems unrealistic for most mature businesses. For Hofer, there are three variations of a strategic turnaround. One is product/market refocusing, a realistic option that will be retained in the analysis below. The other two strategies are "one-level" (100 percent) and "two-level" (200 percent or more) increases in market share. These rather ambitious figures are at odds with a finding by Hambrick, MacMillan, and Day (1982) that among a large sample of mature businesses in the PIMS data base, 90 percent of all year-to-year market share changes were less than five share-points. Presumably, weak businesses would exhibit even a more negative distribution. As Henderson (1979), Porter (1980), and others have noted, market shares in mature industries are relatively fixed. Perhaps this accounts for Hofer's own finding that 10 of the 12 firms he studied pursued operating turnarounds rather than strategic turnarounds. The present authors' pessimism about so-called strategic turnarounds also is consistent with Bibeault's finding that only 4 percent of the firms he studied were revived by "new product breakthroughs." None of this is to say that expansionary turnaround strategies are not possible, only that the ambitious criteria set by Hofer to define "strategic" turnarounds probably preclude observing them in numbers sufficient for systematic study. "Revenue generating" strategies will be noted here, however, but criteria for classifying them as strategic or nonstrategic will not be set.

Tentative Classification of Turnarounds

Hofer's various operating turnarounds, plus his product/market refocusing strategy, provide a reasonable typology of turnarounds about which one can theorize. Hofer's types, which are not inconsistent with the views of Schendel et al. or Bibeault, have the attraction of being holistic patterns, that is, genuine "strategies," rather than isolated moves. This distinction between isolated "moves" and "strategies" is of central importance here in developing hypotheses and selecting data analytic techniques.

The first two strategies can be considered "entrepreneurial" in nature. A *revenue-generating* strategy is an attempt to increase sales by some combination of product (re-)introductions, increased advertising, increased selling effort, and lower prices. A *product/market refocusing strategy* (retained

from among Hofer's "strategic" turnarounds) involves a shifting of emphasis into defensible or lucrative niches. The remaining two strategies can be considered of an "efficiency" nature. A *cost-cutting* strategy typically involves cutbacks in administrative, R&D, marketing, and other seemingly discretionary expenses. Improved management of receivables and inventories also could be considered within the spirit of a cost-cutting strategy. An *asset reduction* strategy involves disposal of assets—primarily fixed assets. Of course, as Hofer noted, combinations of these four strategies also can be pursued.

A Contingency View

Hofer argued that the selection of a turnaround strategy should depend on the situation—in particular the business's closeness to breakeven. According to Hofer, if a business is far below breakeven, an asset reduction strategy is warranted. Such a business must recognize that it should be smaller than it once hoped it would be. If a business is moderately below breakeven, a revenue-generating strategy is called for, according to Hofer. In such a situation, the business probably does not have enough idle capacity to allow major asset disposal, nor is it close enough to breakeven to prosper simply by cutting costs. The business must make a concerted push to increase volume. If a business is very close to breakeven, a cost-cutting strategy is appropriate. Such a strategy often will be sufficient to push the business to acceptable profit levels without exposing it to undue risks. One of the aims of this study was to test Hofer's contingency argument.

It would seem that the market share of a business might be another factor affecting its choice of a turnaround strategy. Specifically, it could be reasoned that businesses with high market share tend to avoid the unpleasant retrenchment strategies—asset reduction and cost-cutting. They typically involve firings (often of close associates) or a dismantling of earlier visions of the scale of the business. Instead, high-share businesses might rely on attempts to exert their relative market power (Porter, 1980) by following the more offensive strategies—revenue generation and product/market refocusing. Their generally strong channels of distribution, brand recognitions, already low costs, and economies of marketing could allow them to solve their problems at less human and organizational cost than can their low-share competitors.

Turnaround Timetables and Magnitudes

Unfortunately, previous researchers of turnarounds have not been very precise about what constitutes poor performance (warranting a turnaround) or good performance (a successful turnaround). Schendel et al., stand alone in providing a concrete definition of a downturn (four consecutive years of declining profits) and of an upturn (four consecutive years of increasing profits). A weakness of their measure is that it lacks an absolute anchor.

A firm whose ROI declines from 30 percent to 20 percent is said to need a turnaround. Conversely, a firm that steadily raises its ROI from -20 percent to zero over four years is said to have successfully turned around. Neither Hofer nor Bibeault specified criteria for "decline" or "success." Part of the problem in establishing criteria is that there exists no universal performance measure or threshold level (Goodman & Pennings, 1977). Still, a systematic study of turnarounds should articulate criteria for decline and upturn, even though they may not suit all circumstances.

The amount of time required for a turnaround is of interest both for its practical significance and in developing a research design. None of the previous turnaround researchers have stressed the temporal aspects of their findings, but some patterns are evident. Among Hofer's successful turnarounds, the average elapsed time from trough to peak was three years. The range was one to four years. Among Bibeault's successful turnarounds, the average elapsed time from trough to peak was four years. No data on the range were provided. Bibeault noted that the time required for a turnaround is a function of the size of the organization: "Altogether, we are talking about anywhere between one and three years, with a $20 million company taking one year and a company the size of Memorex taking three years" (1982, p. 93). Because his study was for entire corporations, presumably the average for business units is less than three years.

Associated with the turnaround timetable is the issue of stages or sequence of moves. Bibeault concluded that most turnarounds involve five stages. First, is the *management change* stage (Hofer agrees that a change in top management almost always is required). Second is the *evaluation* stage (generally a matter of several weeks). Third is the *emergency* stage ("stop the bleeding"; "unloading"). Fourth is the *stabilization* stage (with emphasis on organizational rebuilding). Fifth is the *return-to-normal growth* stage (new products and other entrepreneurial activity). This sequence is somewhat at odds with Hofer. It implies that cost cutting and/or asset reduction is done before any entrepreneurial activity is undertaken. Hofer indirectly expressed some agreement saying that, in general, efficiency-oriented moves tend to produce the quickest, most dramatic results. Thus, from the standpoint of Bibeault's sequence and Hofer's point about relative effectiveness, one could expect that in the short run the most prevalent and effective turnaround moves are of an efficiency nature.

Propositions

The literature summarized above suggests several propositions that were tested in this study of short-run turnaround success:

1. Among mature businesses, short-run turnaround success is associated primarily with retrenchment and efficiency moves, not with entrepreneurial moves (Hofer, 1980; Bibeault, 1982).

2. Still, a variety of successful turnaround "gestalts," or "sets of moves," can be observed. These will include four gestalts that Hofer distilled from his case studies:

—asset reduction
—cost cutting
—revenue generation
—product/market refocusing

Some expected indicators of these four strategies are presented in Table 1. (The list of strategic change variables in Table 1 is the actual set used in the study and is discussed in the section on method.)

Table 1
Expected Indicators of Hofer's Four Turnaround Strategies[a]

Strategic Move	Strategy: Revenue Generation	Product/Market Refocusing	Cost Cutting	Asset Reduction
Product/market initiatives				
Sales from new products	++[a]			
Product R&D	++		−	
Marketing	++		−	
Product quality	−−	+		
Price	−−			
Market share	++	−		−
Efficiency				
Employee productivity		+	++	
Relative direct costs		+	−−	
Asset levels and use				
Receivables/revenue	+		−	−−
Inventories/revenue	+	−	−	−−
Plant and equipment newness				−−
Capacity utilization	+	−		++

[a]Two signs suggest a primary indicator (stressed by Hofer as integral to the strategy); one sign suggests a secondary indicator (an expected by-product or lesser component of the strategy).

3. The tendency to pursue any of the above four strategies is partly a function of the position of the business during its decline:
—Businesses with low capacity utilization (a surrogate for closeness to breakeven) will tend to pursue an asset reduction strategy.
—Businesses with relatively high capacity utilization will tend to pursue a cost cutting strategy.
—Businesses with relatively high market share will tend to pursue entrepreneurial strategies, that is, revenue generation and product/market refocusing.

This study also examined some recurring unsuccessful turnaround gestalts, although no theory was available for establishing propositions.

Method

PIMS Data Base

The data used in this study were drawn from the Profit Impact of Market Strategies project (PIMS), an on-going, large scale statistical study of

environmental, strategic, and performance variables of individual business units. About 200 corporations submit data annually on a total of 2,000 of their business units. Each business—often a division—is a distinct product-market unit. (For a technical summary of the PIMS data base, see Schoeffler, 1977.)

Anderson and Paine (1978) provided a comprehensive critical review of the PIMS data base. Most of their concerns were about the ways in which PIMS data had been statistically analyzed and presented in previous studies. Although they raised limited concerns about the quality of the data, they more generally acknowledged the data base to be of high quality and reliability. Hambrick et al. (1982) also concluded that the data base seems reliable, given its questionnaire methodology.

The Turnaround Sample

The sample used in this study was drawn from the last four years of available data on all mature industrial-product businesses in the data base ($n = 770$). A mature business is defined by PIMS as one in an industry whose real growth is less than 10 percent annually, in which most potential buyers understand the product, and whose set of competitors is well known. Growth and decline businesses, as well as consumer-product businesses, were excluded so as to achieve some homogeneity.

A business was included in the turnaround study if its average pretax return on investment (ROI) for the first two years under study was below 10 percent. This equates with roughly a 5 percent after-tax ROI, which would be well below the cost of capital for firms in the mid-to-late seventies, the period covered by the study. (The average pretax ROI for all mature industrial-product businesses in the PIMS data base was 25 percent.) A total of 260 businesses met the criterion for low performance and so were included in the study. The 260 businesses included both those that subsequently made performance improvements and those that did not.

Four years' data were available in the data base used. Given Hofer's (1980) and Bibeault's (1982) findings, this time frame should be sufficient to observe many business-level turnaround attempts. Still, the short timeframe will not allow all the turnaround attempts (or their aftermaths) to be seen in their entirety and hence limits the study.

Variables

A total of 12 strategic change variables were included in the study (Table 1). (Definitions of the variables may be obtained from the authors.) The list was based on three considerations. First, only variables that are annually reported to PIMS, and hence can exhibit change, were included. This ruled out some interesting possibilities such as product line breadth and number of customers. Second, the available variables were screened for their redundancy (e.g., capacity/market size and market share) and for their

statistical properties (e.g., process R&D/revenues has a very restricted range). As a result, all correlations among the 12 variables were less than ±.30. Third, variables with a strong mathematical link to ROI (the performance measure) were excluded. Examples are investment/revenue and value added/revenue. The problem with such variables is that their statistical association with ROI is due in great part to their arithmetic link. (See MacMillan, Hambrick, and Day, 1982, for a fuller description of this problem.)

The change in a strategic variable for a business was calculated using the difference between the average for the first two years (the period when ROI was less than 10 percent) and the average for the last two years. This approach closely mirrored results obtained using a four-year least squares trend line.

ROI was the primary performance measure of interest because for mature businesses it is a common, often dominant, goal. It has the weaknesses of any accounting measure, for example, varying depreciation and inventory valuation methods. However, it is the most suitable available in the PIMS data base. Market share figures also will be reported to provide a broader picture of each turnaround strategy observed.

In order to identify successful turnaround gestalts, "success" was defined as a business that achieved an average ending ROI (years three and four) of at least 20 percent ($n = 53$). An unsuccessful turnaround was a business whose ending ROI was still less than 10 percent (even though it might have improved significantly, say from −20 percent) ($n = 153$). Thus, absolute criteria rather than relative criteria were used for defining success. There are weaknesses in this approach that other of the statistical analyses attempt to overcome. (There were 54 businesses with ending ROIs between 10 and 20 percent that were omitted from certain of the analyses.)

Data Analysis

Least-squares regression was used for identifying the strategic changes most strongly associated with improved performance. Cluster analysis (Euclidean distances, minimum squared-error grouping technique) was used for identifying successful strategic gestalts. Cross-tables and chi-square analysis were used for identifying relationships between position factors and selection of different turnaround strategies.

Results and Discussion

Strategic "Moves" Associated with Turnaround

It was hypothesized that short-run turnaround success among mature businesses would be associated primarily with improved efficiency and retrenchment, rather than with product/market initiatives. This reasoning led to the hypothesized signs presented in Table 2. Multiple regression was used to test the effects of these isolated strategic moves (as distinguished

Table 2
Regression of Strategic Moves on Change in ROI ($N = 260$)

Strategic Move	*Hypothesized Sign*	*Standardized Beta (Actual)*
Product/market initiatives		
Sales from new products		.01
Product R&D/sales	−	−.06*
Marketing/sales	−	−.19***
Relative product quality		.03
Relative price		.03
Relative market share		.16***
Efficiency		
Employee productivity	+	.43***
Relative direct costs	−	.00
Asset levels and use		
Receivables/revenue	−	−.09**
Inventories/revenue	−	−.14***
Plant and equipment newness	−	.08**
Capacity utilization		.01
Served market growth		.12***
R^2		.53***

*$p < .10$
**$p < .05$
***$p < .01$

from the examination of strategic gestalts, to be discussed below). The dependent variable was ROI change (ending ROI minus beginning ROI; mean = +4 percent; s.d. = 8). For this particular analysis it seemed more satisfactory to retain interval-quality data on all 260 observations rather than to use discriminant analysis between successful and unsuccessful turnarounds. The regression results presented are similar to patterns yielded by alternative analyses.

The hypotheses received mixed support. Cutbacks in R&D, marketing, receivables, and inventories all were associated with improved ROI, as expected. Improved employee productivity also was a significant factor in raising ROI. Improved employee productivity can stem from a variety of submoves that are impossible to isolate from the data available. The business could be increasing its value added. This seems unlikely, given the apparent negative effects of value-creating initiatives (e.g., marketing, R&D). Alternatively, and more likely, the business could be getting more output from its employees through some combination of relaxed union work rules, motivation, and layoffs of marginal or semiproductive employees. In general, though, there were indications that "belt-tightening" was a key aid to short-term turnarounds.

The expectation that reductions in relative direct costs would help ROI was not observed. No persuasive explanation comes to mind as to why this indicator of improved efficiency was not found to be significant.

It was expected that increased plant and equipment newness would impair the ability to raise ROI. The rationale was that plant and equipment newness (net book value/gross book value) has a minor mathematical link

to ROI, tending to depress it. The positive beta actually observed is especially notable because it includes an offsetting of the downward mathematical link. Apparently the efficiency that can be derived from disposing of old assets and/or adding new state-of-the-art assets is, on average, a significant aid to ROI for poorly performing businesses.

Unexpectedly, increases in market share were positively related to increases in ROI. Recall that the logic was that product/market initiatives were not likely to be successful short-term turnaround avenues. The finding seems to square with theories about the payoffs from market share, stemming from experience, scale, and market power (Henderson, 1979; Porter, 1980; Schoeffler, Buzzell, & Heany, 1974). But because both the independent and dependent variables were expressed in terms of change (rather than static), the finding casts doubt on the common supposition that market share and profitability cannot be pursued in tandem (Biggadike, 1979; Henderson, 1979). For this sample, increases in market share helped, not hurt, *current* profitability. This finding may be frustrating for the strategist, because various ways of building market share (product R&D, marketing, product quality, and new products) were not encouraged by the regression results. Through the gestalts reported below, some insight can come as to how some businesses profitably gained market share.

One of the weaknesses of the research design was lack of data on the origin of the business's trouble, or on how long the business had been in trouble. Of particular interest was the possibility that some of the businesses were suffering as part of a short-term malaise in their industry, and that the most reasonable response would be to be patient and wait for an industry upturn. In this vein, Bibeault (1982) found that 5 percent of the turnarounds he studied were "competitive environment turnarounds." A straightforward way to test for this phenomenon was to include served market growth (change in primary demand over the four years) in the regression. As might be expected, this variable was a significant, though not dominating, predictor of ROI change. A more complete test of the effects of industry "munificence" (Porter, 1980; Staw & Szwajkowski, 1975) was not possible with the available data, but it is apparent that short-term business fates are tied somewhat to industry characteristics. For some businesses, the appropriate response may be to wait for an industrywide improvement. For others, it may be to set a course that steers clear of fluctuating market sectors, powerful customers, or cutthroat competitors that can make an overall industry appear unattractive (Porter, 1980).

In sum, the regression analysis indicated that various forms of belt-tightening and productivity improvements were associated with ROI improvements. A shift to a newer mix of fixed assets also helped ROI for this sample. This is an especially noteworthy finding. New fixed assets place a downward pressure on ROI, strictly because of arithmetic. Gains in market share also were associated with gains in ROI. This finding suggests that market share and profitability at times can be pursued in tandem, even in the short term. For the strategist, the apparent payoff from market share

begs the question, "How do I gain market share at the same time I am belt-tightening?" This is a question that the cluster analysis addresses to some extent.

Successful Turnaround Gestalts

A major aim of the study was to identify common "packages" of strategic moves or turnaround "gestalts" (Miller, 1981; Miller & Friesen, 1977). Hofer's four types of turnarounds were set up as straw men against which the results of cluster analysis could be compared. Included in the clustering were 53 businesses whose ending ROIs were over 20 percent. The researcher faces a difficult decision as to how many clusters to report. A discussion of the decision to report three clusters will benefit from a description of those three clusters.

Three Successful Gestalts. Table 3 presents the profiles of three successful turnaround strategies, as well as the profile of all 260 poorly performing businesses. For the sake of the clustering algorithm, all variables were standardized (mean = 0; s.d. = 1) using as norms data from all mature industrial-products businesses. Thus, the means for the 260 poorly performing businesses are not necessarily zero, and they may be of interest themselves.

Table 3
The Profiles of Three Successful Turnaround Gestalts[a]

Strategic Move	*All Low Performers (N=260)*	*Asset and Cost Surgery (N=6)*	*Selective Product/Market Pruning (N=19)*	*Piecemeal Productivity (N=28)*
1. New products	.02	.21	−.13	.06
	(1.03)	(.61)	(.65)	(.35)
2. Price	−.05	−.19	.33**	.05
	(.86)	(.21)	(.62)	(.77)
3. Product R&D	−.16	−3.30***	−.00	−.09
	(1.18)	(2.05)	(.80)	(.40)
4. Plant and equipment newness	−.32	−1.27***	−.30	−.26
	(.84)	(1.06)	(.79)	(.72)
5. Marketing	−.17	−.72***	−.60**	−.26
	(1.00)	(1.29)	(1.00)	(.39)
6. Receivables	−.20	−.59***	−1.92***	.13
	(1.09)	(.49)	(1.09)	(.56)
7. Inventories	−.32	−1.10***	−1.09***	−.31
	(1.03)	(.77)	(.93)	(.72)
8. Capacity utilization	.12	2.06***	−.39**	.71***
	(1.03)	(.96)	(1.24)	(.70)
9. Employee productivity	.27	3.69***	.97***	.60***
	(1.23)	(3.19)	(1.23)	(.74)
10. Product quality	.16	.00	.46**	.18
	(1.30)	(.47)	(.76)	(.91)
11. Relative direct cost	−.06	−.37	.40*	.02
	(1.10)	(.90)	(1.16)	(.52)
12. Market share	−.03	.49	.38	.13
	(1.04)	(.90)	(.80)	(.69)

[a]Means reported. Standard deviations in parentheses.
*$p < .10$
**$p < .05$
***$p < .01$

The first cluster, consisting of six businesses, has several distinguishing features: significant reductions in R&D, marketing, receivables, and inventories; significant declines in plant and equipment newness, suggesting disposal of newer (hence, most saleable) facilities. This leads, in turn, to much higher capacity utilization levels and significantly increased employee productivity levels.

This asset/cost surgery strategy represents a combination of Hofer's asset reduction and cost-cutting strategies. Basically, every type of excisive move possible was taken by the businesses in this cluster. This strategy, to a great extent, represents the moves one would make if adhering to the regression results presented earlier, with the added emphasis here on asset reduction (or, perhaps in some cases, nonreplacement of assets). A skeptic of this strategy would say that it is short-sighted and enfeebling. Such a view pales in light of the steady market shares reported by these businesses. Apparently there are some businesses that have surplus assets and high costs that can be substantially cut back, with a result of immediate profit improvement but no damage to the market position of the business.

The second cluster, consisting of 19 businesses, suggests a *selective product/market pruning* strategy. It can be inferred that these businesses refocused toward those sectors that were most profitable or in which they had a distinctive strength. Manifestations of this strategy were: increases in relative prices, direct costs, and product quality (signaling a tendency to focus on those niches in which the business had a quality edge rather than a cost edge); decreased marketing expenses and inventory expenses (possibly stemming from a narrower, more homogeneous set of products and markets); reduced receivables (abandoned marginal customers or those who exert great power over credit terms); decline in capacity utilization because the emphasis was not on volume but on selective high-profit opportunities; increase in employee productivity, possibly as a result of the enhanced value added (higher quality) of the average product or as a result of fewer product lines (lower changeover costs, etc.).

This strategy is a variant of Hofer's product/market refocusing strategy. Here again, even though the strategy is one of caution (this time selectivity instead of retrenchment) rather than entrepreneurial boldness, market shares remained stable.

This cluster highlights the advantage of cluster analysis for strategy research. On the basis of the more traditional econometric technique of regression, one would conclude that capacity utilization is not an important predictor of improved performance, and common sense would indicate that, if anything, high capacity utilization is desirable. But when viewed as part of a gestalt—a set of internally consistent strategic moves—it is seen that a decrease in capacity utilization can be a logical accompaniment of a rather powerful strategy for turning a mature business around.

The third cluster consists of 28 businesses and has only 2 distinguishing features: increased capacity utilization and increased employee productivity. These characteristics do not paint a very specific picture of what these

businesses actually did. The standard deviations of all the changes are moderate in magnitude, indicating that a number of substrategies, or tactics, were employed. This might be considered a piecemeal strategy; it does not involve a comprehensive set of moves. Rather, each business in this cluster perhaps made as few as one or two modifications—these differing from one business to another—that tended to accompany increased capacity utilization and employee productivity and, in turn, a successful turnaround. It also may be that a number of these businesses were in industries whose overall sales improved, thus raising their capacity utilization and employee productivity figures.

Alternative Cluster Solutions. The choice to report three clusters was not arbitrary. In fact, insight can come from the factors leading to the decision.

The clustering algorithm begins by considering each object—in this case a turnaround business—as a distinct cluster. Reflecting the 12 strategic moves being studied, 12-dimensional distances are calculated for each pair of clusters. The two closest clusters are combined into a new cluster. This process, which is a form of a "hierarchical" clustering procedure, continues until all objects are combined into one cluster.

Then the researcher has the problem of deciding how many clusters (between 1 and n) provide the most meaningful portrayal of the data. The rule of thumb is to look for a pronounced increased in the "tightness" (mean squared error) of the clusters as the algorithm moves from, say, a 5-cluster to a 4-cluster solution. In this study, the data yielded only steady increments for all solutions below the 10-cluster level. This is a common problem when clustering social science data: "natural" species or genera simply do not exist. In such a case, the researcher must use judgment as to which cluster-level solution to report.

One could legitimately ask whether a 4- or 5- or 6-cluster solution wouldn't portray a richer array of turnaround gestalts than was portrayed with the 3-cluster solution. One would especially hope that the biggest cluster ("piecemeal" strategy), which provides scant insight, might yield two or three more interesting clusters when it splits in the clustering hierarchy. Unfortunately, it does not split until the 8-cluster solution is reached and, even then, the two resulting clusters are no more suggestive than what has been presented. Rather, up until the 8-cluster solution, it is the two already rich strategies—"asset/cost surgery" and "selective product/market pruning"—that split into smaller and smaller "substrategy" clusters.

This pattern should not be taken as a detraction from the study. Rather, it suggests at least three interesting possibilities. First, it appears that the dominant turnaround strategy is not a gestalt, but rather piecemeal moves that vary from business to business and hence are difficult to generalize about. A business that is in only marginally poor condition might pursue a piecemeal approach, as might a business that is simply waiting for its industry as a whole to improve. Second, it appears that the two "fundamental" turnaround gestalts are the two reported here: asset/cost surgery and selective product/market pruning. As the clustering algorithm moved

from a 3-cluster to an 8-cluster solution, only new variations of these two strategies were observed. No other basic gestalts emerged. This raises the third conclusion: Hofer's revenue generation strategy was not found in the cluster analysis. Granted, some businesses significantly raised their market shares or revenues, but no recurring combination of revenue-generating tactics was observed. On the one hand, this raises questions about the efficacy of a revenue-generating strategy in a mature industry. After all, market shares are relatively fixed, brand loyalties relatively solid, and technology stable. Can an aggressive, entrepreneurial strategy work under such conditions? On the other hand, it may be that a revenue generating strategy requires highly situational moves (certainly more so than does the asset/cost surgery strategy) that are difficult to observe in their myriad combinations, especially in a heterogeneous sample.

Situations Affecting Strategic Choice

It was theorized that the choice of a particular turnaround strategy would be a function of the business's situation, particularly its market share and its capacity utilization. To test this, the successful businesses were divided into high- and low-capacity utilization categories (cutpoint = 75 percent, the median for all 260 low-performing businesses), and high and low market share (cutpoint = 29 percent) categories, and further subdivided according to which of the three successful strategies they had pursued. The results, presented in Table 4, indicate significant associations between the business's situation and strategy selected.

Table 4
Situational Factors and Choice of Turnaround Strategy[a]

Situational Factors	*Strategy Selected*			
	Asset/Cost Surgery	*Product/Market Pruning*	*Piecemeal*	*Overall*
Low market share—low capacity utilization	3	3	4	10
Low market share—high capacity utilization	0	7	5	12
High market share—low capacity utilization	3	4	11	18
High market share—high capacity utilization	0	5	8	13
	6	19	28	53

[a]Significance by χ^2 test = $<.05$

All of the six businesses that used an asset/cost surgery strategy had low capacity utilization. This generally conforms to Hofer's supposition that businesses that are far below breakeven will tend to (or should) retrench. Such businesses have only a slim likelihood of reaching profitability through less dramatic moves.

The 19 businesses that used the product/market pruning strategy came from all situational categories, but there was a marked tendency for them to have high capacity utilization (12 out of 19). Presumably, these were

businesses that were operating at "healthy" volumes, but they simply had a poor product mix. Their response was to shift to higher-margin products or markets, even if it meant reduced capacity utilization (as indicated by the earlier cluster profiles).

The 28 businesses that used the piecemeal strategy were primarily high-market share businesses (19 out of 28). Presumably, these businesses were strategically healthy and felt that they had to make only minor or selective changes in order to become profitable. They did not have to undergo the major, comprehensive changes that some of the other businesses felt compelled to make.

In summary, it appears that businesses do select a turnaround strategy partly on the basis of their market share and capacity utilization. Hofer's scenarios were basically confirmed, particularly as regards the selection of retrenchment strategies by businesses operating at low capacity utilization levels. These findings should stimulate more systematic inquiry into the inevitable array of contingent factors entering into the turnaround decision, much as was done by Harrigan (1980) in looking at strategies for declining industries.

Unsuccessful Turnarounds

A legitimate question is whether the successful turnaround gestalts differed from the most common unsuccessful gestalts. Space limitations prevent a detailed analysis of unsuccessful turnarounds, but a brief discussion of the findings may be instructive. This description relies on a 4-cluster solution for the 153 businesses whose ROIs did not rise above 10 percent during the period under study.

The first cluster consisted of six businesses that undertook significant entrepreneurial initiatives (increased R&D and marketing) but whose efficiencies dropped precipitously (increased inventories, decreased employee productivity, and decreased capacity utilization). It could be argued that this is a far-sighted strategy that cannot be expected to yield fast profits. Such an argument is weakened by the substantial drop of the average market share of these businesses during the change period. These businesses appear not to have improved their fitness for the future. Five of the six members of this cluster had high beginning market share, suggesting that high market share might inject a blind sense of optimism or market power that causes bold entrepreneurial attempts with no attention to efficiency.

The second cluster consisted of 13 businesses that had only one distinguishing feature: dramatically reduced R&D expenditures. R&D may be seen as the first "discretionary" budget item to cut, especially by mature businesses that face relatively calm technological environments. As part of a broader cost-cutting effort, as was waged by the successful asset/cost surgery businesses, cutbacks in R&D can help bring about an early turnaround. By itself, though, a cut in R&D is not a big contributor to a turnaround, and it may have the unfortunate side effect of making the business feel that it is doing something momentous to bring about a turnaround

when, in fact, relatively little has been done. Of the 13 businesses in this unsuccessful cluster, 10 had high market share. Here again may be another form of optimism on the part of high share businesses. In this case, perhaps they think that they simply do not have to do much to turnaround—that a mere cutting of R&D will be sufficient.

The third cluster consisted of 12 businesses that had only 2 distinguishing features: a significant increase in new products and a significant decrease in marketing expenses. This obvious inconsistency may point to an overreliance on the new products as a way out of trouble. Just as the businesses in the previous cluster may have thought that cutting R&D would be sufficient, these businesses may have thought that new products would be sufficient for turning the business around. Unfortunately, new products tend to put sharp pressure on current profits (Hambrick, 1983), such that the best hope from such a strategy is that it will improve the business for the future. Such logic pales in view of a lack of any significant market share changes by businesses in this cluster. Of the 12 businesses in this cluster, 9 had low beginning market shares.

The fourth cluster consisted of 122 businesses and had no distinguishing characteristics, hence qualifying as another piecemeal approach. Obviously, if more clusters were examined, this large cluster could split into more interpretable, interesting subclusters. Businesses in this cluster were very evenly distributed in terms of their beginning market shares and capacity utilization.

The purpose here has not been to document all the possible ways in which a business can fail in a turnaround attempt. Rather, the primary aim has been to confirm that the most common failure gestalts are quite different from the primary success gestalts. This appears to be the case, although ambiguity remains about the nondescript piecemeal strategies that emerge in both groups. A secondary aim has been to present some gestalts that can suggest the kinds of unsuccessful turnaround strategies that may occur. Brought to light have been strategies that are unduly bold and strategies that are unduly conservative. Obviously, much more research is needed into failure gestalts in general.

Summary

This study of turnaround attempts by businesses in mature industries has produced a variety of significant findings. On the basis of regression analysis, it was found that efficiency measures are major avenues toward improved profits. It also was found that market share increases are associated with increased profits, although the regressions gave no indications of how market share increases might come about—an especially frustrating shortcoming in light of the apparent payoff from "belt-tightening" moves. Some doubt has been cast on the notion that profits cannot increase at the same time market share is being increased. Finally, the regressions confirmed that improvement in ROI is partly a function of increased industry sales.

The cluster analysis indicated three primary successful turnaround gestalts: asset/cost surgery, selective product/market pruning, and a piecemeal strategy. These bear a fair resemblance to the turnaround strategies that Hofer proposed on the basis of case evidence. It was found that the choice among these three strategies was associated with certain characteristics of the business, again basically in line with Hofer's suppositions. Asset/cost surgery was pursued primarily by businesses with low levels of capacity utilization; selective product/market pruning was undertaken primarily by businesses with high levels of capacity utilization; and the piecemeal strategy was followed primarily by businesses with high market share.

With the exception of a heavily-populated piecemeal strategy, the unsuccessful gestalts bore little resemblance to the successful gestalts and further provided some sketchy insight into some common types of ill-conceived (or ill-executed) turnaround attempts.

The study has several important limitations that bear noting. First, no data on causes of downturns were available, hence ruling out a direct test of the theory offered by Schendel et al. (1975) that turnaround attempts must address the source of the problem. Second, the lack of a long time-series of data hurt in another way. It prevented examination of the aftermath of the short-term moves actually observed. Do certain types of "quick fixes" lead to ultimate failure? Or, conversely, does quick success tend to be a sign of resilience and strong management? No light was shed here. A third, and related, problem is the reliance on ROI as the performance measure. ROI is a very limited, manipulable figure, even though it is a common indicator of effectiveness of mature businesses. A multidimensional view of performance would have been desirable but was not possible with the data available. A fourth limitation is that no organizational or managerial characteristics were studied. This reflects a shortcoming of the PIMS data base in general. Bibeault placed major emphasis on leadership, style, teamwork, and other "soft" factors in turnarounds. Such factors should be strongly considered for inclusion in future turnaround studies. Finally, the sample studied is narrow—only mature industrial-product businesses. Would entrepreneurial endeavors have greater apparent payoff in consumer businesses? In growth-stage businesses? What would the successful gestalts look like if service businesses were observed? These are sectors in which turnaround evidence should be gathered and analyzed.

Overall, the study has added to a sparse literature but leaves open many questions for future study. Both theoreticians and practitioners need frameworks and evidence for thinking about responses to poor organizational performance.

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An Examination of Level and Direction of Effort and Job Performance[1]

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The degree to which effort level and direction of the effort were related to job performance was examined in a field setting. Both direction and effort level were found to be significant predictors of individual performance, and direction of behavior contributes uniquely to the prediction of performance.

Most models of job performance include motivation as a necessary condition for performance (Porter & Lawler, 1968; Porter, Lawler, & Hackman, 1975; Vroom, 1964). With few exceptions, however, motivation has been reduced to a simple unidimensional variable, effort, which is usually measured by a self-report of how hard one tried. Campbell and Pritchard (1976) and Terborg (1976, 1977) argue that such a narrow view of motivation is inadequate to understand the place of motivation in job performance.

Campbell and Pritchard (1976) offer a more complete view of motivation in their attempt to define the term. They note that motivation theories must explain direction, amplitude, and persistence of behavior. They also suggest initiation of behavior as a fourth dimension of motivation (although this is not included in their definition). Within this more complete view of motivation, simple self-reports of how hard one worked cannot adequately represent motivation without the dubious assumption of the appropriateness of the particular activities into which that effort is directed and maintained. This study considers the importance of the directional component of motivation in predicting job performance.

Emphasis on direction of behavior is not new to the motivation literature. Models of work performance have included role perceptions and their accuracy to represent direction (Gavin, 1970; Lawler & Suttle, 1973; Porter & Lawler, 1968). Terborg (1976) and Terborg and Miller (1978) also made

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use of the directional component of motivation in laboratory studies of the influence of goal setting and incentive systems on motivational components and performance. These studies both highlighted the importance of measuring direction as well as level of effort in studies of motivation. Moreover, in a recent theoretical work, Naylor, Pritchard, and Ilgen (1980) emphasize the importance of the directional component of motivation. Their model represents motivation as a resource allocation decision process. Individuals have a reservoir of energy that can be allocated among a variety of activities, some of which are productive and some of which are not. It is suggested that regardless of one's overall arousal level or level of available energy, the allocation of energy between relevant and irrelevant activities can make the difference between success and failure. Again, this emphasis of the directional component of motivation stands in clear contrast to the more typical emphasis on amplitude or intensity. It also suggests that attempts to understand the relationship between motivation and performance will be misguided and incomplete as long as researchers fail to deal adequately with motivation as a multidimensional construct that demands multidimensional operationalization and measurement (Terborg & Miller, 1978).

It is important to note that directional choices are more important in some jobs than others. Technological constraints remove the latitude available in many jobs such that individual resource allocation decisions are overdetermined. Routinized operations in assembly or manufacturing may allow only one direction of activity. Thus, motivational choices are reduced to how much energy will be expended in that single direction.

In many jobs, however, a significant amount of latitude is given to the worker in terms of work procedures, task focus, equipment used, and so on. In such situations, the directional component of effort increases in importance. Individuals in managerial positions, sales-related positions, and many professions are likely to find themselves frequently facing decisions about the direction of their actions. Although considerable autonomy exists for defining one's work role, variation in subsequent performance is likely to be a consequence of the direction one has chosen, rather than simply the level of effort expended.

Previous research (Terborg, 1976, 1977; Terborg & Miller, 1978) has examined influences on both direction and level of effort in constrained laboratory settings in which only relatively simple directional choices are possible. The purpose of this study was to examine the degree to which direction and level of effort were related to job performance in a field setting in which respondents had considerable latitude in choosing both effort level and direction. Specifically, this study examines the degree to which measures of the directional component of motivation can predict performance beyond that possible from a measure of effort level.

Method

Sample and Setting

Real estate representatives from two large firms in a large midwestern city were voluntary participants in this study. Company 1 provided 59

representatives from 5 of its branch offices, and company 2 provided 67 people from 6 of its branch offices. Branch offices from each firm were selected so as to match on geographic location, market characteristics (i.e., average house price), and average representative tenure in real estate. Of the total sample of 126 participants, 68 percent were female. Average tenure in the real estate industry was 5.5 years, suggesting that most have the necessary ability to survive in a position that depends solely on commissions for income. Although differences in ability are partially controlled through this restriction of range in tenure, it is likely that there remains some variance in ability and that this residual variance could contribute to the prediction of performance. However, complete prediction of performance was not the purpose of this study. The focus is on motivational components and performance, not ability.

Procedure

On approval of the study by top management in both firms, the authors arranged data collection procedures with managers in each branch office selected for the study. A series of interviews, which were conducted for scale development, was followed by a data collection session in which representatives completed questionnaires as part of their monthly sales meeting. The authors and assistants personally administered the questionnaires at each branch office. Participants were asked to provide their social security numbers for use in later retrieval of performance information, and 85 percent gave this information. Complete confidentiality of individual responses was guaranteed and maintained.

Measures

Effort level was operationalized as the average number of hours per week the respondent invested in real estate activity. This is consistent with Terborg's (1977) operationalization of effort as time on task in a laboratory setting. A self-report of hours per week was necessary because much of one's time is spent alone and outside the office with work demands that may vary considerably from day to day.

Direction of Effort. The measurement of direction into which effort is channeled was of particular importance in this study. Interviews were conducted with several successful representatives in each company in order to define the typical behaviors exhibited on the job. This information was content analyzed and used to develop a set of 57 items representing all major activities in the real estate field. Items were written so as to use a 7-point response scale that ranged from 1 = Never to 7 = Always. Rather than forming scales based on a priori conceptualizations of real estate activity, factor analysis of the 57 items was conducted to provide an empirical basis for developing an internally consistent and meaningful set of scales. Of course, cautious interpretation is warranted due to instability of factor-solutions

that are based on small samples. Both orthogonal and obilique factor solutions were evaluated in terms of interpretability. Relative size of the eigenvalues and interpretability were the basis for the use of a 4-factor orthogonal solution representing 48 percent of the total variance. These four factors were the basis for scale construction. The procedure produced 26 items with adequate loadings ($\geq .30$) on one of 4 factors. The remaining 31 items were eliminated due to small or multiple loadings.

The first factor represented activity directed toward building and maintaining a social network. The 10 items loading on this factor concern socializing with past clients, meeting potential clients on a social basis, exchanging referrals, and so on. Internal consistency for the social network scale was .78. The second factor included seven items dealing with professional development. Items included attending training programs, maintaining professional contacts, following new developments, and the like. Internal consistency for the professional development scale was .74.

The third factor included four items reporting visibility. These items all represent activities such as wearing a name tag, company logo, and mentioning real estate to others, items that increase one's visibility among the public. Internal consistency for the visibility scale was .66. Client selectivity was descriptive of the fourth factor. The five items loading on this factor assess the degree to which one screens potential clients (i.e., work with only those ready to buy or sell, be selective in choosing clients). Internal consistency for this 5-item scale was .68. Scale intercorrelations were small, ranging from $r = -.09$ to $r = .17$.

Several specific questions included elsewhere in the survey provide some basis for the validity of the four scales defined above. For example, the frequency of lunch/dinner with clients per week was positively correlated with the social network scale ($r = .40$). Professional development scores were positively correlated with reported number of subscriptions to trade magazines ($r = .33$). Visibility scores were positively correlated with the number of in-person "cold" calls made by respondents ($r = .34$). Client selectivity scores showed a positive correlation with a rating of dependence on past clients to generate successful leads ($r = .29$). Relationships such as these give some confidence in the validity of the scales.

Performance Measures. The questionnaire included four questions concerning real estate performance. Respondents were asked to report (a) the number of houses sold in the past 12 months, (b) the number of houses listed in the last 12 months, (c) total commission for the last 12 months, and (d) their self-ranking in relation to their colleagues in real estate. Although such self-report variables may be problematic in many settings, discussions with managers and representatives from both companies indicated that all are very much aware of these performance indicators. All of this information, including cumulative income, generally was posted in the branch offices. Thus, there is good reason to expect these performance measures to reflect performance accurately. Intercorrelations among the four measures ranged from $r = .60$ to $r = .75$. Such levels of interdependence

may suggest that they be reduced to a single composite. The decision was made to analyze them separately, however, because these indicators have specific meaning and serve particular purposes in the real estate industry.

Although both companies initially granted permission to gather performance data from company records at a later time, it was possible to obtain performance data from company 1 only. Company reorganization and loss of the authors' executive contact prevented obtaining comparable information in company 2. Performance data from company 1 records include (a) number of listings taken, (b) number of listings sold, (c) number of houses sold, and (d) commission income. The data cover a 9-month period following questionnaire administration. The number of listings sold is distinguished from houses sold because company listings that are sold bring a higher rate of commission than do houses that are not listed with the company. Correlations between these record-based performance measures and self-report measures ranged from $r = .61$ to $r = .70$, indicating a reasonable level of convergence given the marked downturn in the economy and real estate industry.

Analysis

The relationships between motivational variables and performance measures were investigated using correlation and regression procedures. Hierarchical regression analyses were performed to test for the unique relationships of direction and effort level (Cohen & Cohen, 1975). Analyses were performed on the total sample as well as within each company because of the possibility of unique effects in each firm.

Results

The relationships between motivation variables and performance are shown in Table 1. Correlations based on the total sample appear first, followed by within-firm correlations. Total sample correlations show that only effort level and emphasis on social network activity have consistent and significant relationships with performance variables. Higher levels of effort, measured by average hours worked per week, and social network activity are positively associated with number of listings, number of sales, commission, and self-ranking of performance. Visibility shows a negative relationship to self-ranking, and client selectivity is positively related to self-rated performance. Professional development activity shows no significant relationship with performance in the total sample. Correlations between this scale and performance within each firm also were not significant.

Different relationships become apparent when correlations within each firm are examined. Although effort level is significantly related to all performance variables within each firm, the activity scales that represent direction vary considerably in their relationships with performance. Social network activity is positively related to all performance variables in company 1,

Table 1
Correlations Between Motivation Variables and Performance

Motivation Variables		*Correlations*			
		Number of Sales	*Number of Listings*	*Commission*	*Self-Ranking*
Effort level	Overall	.30**	.32**	.38**	.32**
	Company 1	.30*	.29*	.36**	.28*
	Company 2	.29*	.34*	.40**	.36**
Direction					
Social network activity	Overall	.26**	.27**	.30**	.26**
	Company 1	.44** [a]	.39**	.42**	.27*
	Company 2	.11 [a]	.17	.18	.26*
Professional development activity	Overall	.01	−.05	−.07	−.02
	Company 1	.07	−.03	−.12	.05
	Company 2	−.06	−.03	.05	−.03
Visibility activity	Overall	−.02	−.08	−.07	−.26**
	Company 1	.13 [a]	.06 [a]	.02 [a]	−.15 [a]
	Company 2	−.46** [a]	−.40** [a]	−.37** [a]	−.48** [a]
Client selectivity activity	Overall	.04	.06	.05	.22**
	Company 1	−.15 [a]	−.09 [a]	−.16 [a]	.08
	Company 2	.36** [a]	.32** [a]	.41** [a]	.36**

[a]Significant difference in correlation coefficients, $p < .05$. N for Company 1 = 59; N for Company 2 = 67; Total N = 126.

*$p < .05$

**$p < .01$

but it is related only to self-ranking in company 2. Client selectivity and visibility show significant relationships with all performance variables in company 2 but not in company 1. Visibility shows an inverse relationship with performance, indicating that those who maintain a low profile tend to be more successful in company 2. Being selective in choice of clients is positively related to performance in company 2. Thus, success in this company appears to rely on the degree to which one screens clients and avoids large time and effort commitments with the casual or curious clients who have little chance of being involved in a sales transaction.

The unique relationships observed in the correlation analysis made it necessary to examine the question of unique contributions of directions and effort level within each firm. Hierarchical regression analyses of data within each firm are presented in Table 2. Only directional variables showing significant relationships were retained in these regression analyses. The results in Table 2 show that addition of a directional component adds significantly to the prediction of performance in both firms. In company 1, social network activity accounts for an average of 12.5 percent of the variance in performance beyond that achieved using effort level alone. Similarly, data from company 2 show that client selectivity and visibility (inversely) uniquely contribute to the prediction of performance beyond the effects of effort level. Client selectivity and visibility were added into the equation jointly. These directional variables are able to account for 25.2 percent of the performance variance controlling for effort level.

The results represented thus far are based on self-report performance variables for a period of 12 months prior to questionnaire administration.

Table 2
Regression of Self Report Performance on Motivation Variables

	Squared Multiple Correlations			
	Number of Sales	*Number of Listings*	*Commission*	*Self-Ranking*
Company 1: N=59				
Effort level	.09*	.08*	.13**	.08
Effort level and direction: social network	.25**	.22*	.27**	.14
Change in R^2 unique variance accounted for by direction	.16**	.14**	.14**	.06
Company 2: N=67				
Effort level	.08*	.12*	.16**	.13**
Effort level and direction: client selectivity/visibility	.37**	.32**	.41**	.40**
Change in R^2 unique variance accounted for by direction	.29**	.20**	.25**	.27**

*$p<.05$
**$p<.01$

Table 3
Regression of Record-Based Performance on Motivation Variables in Company 1[a]

	Squared Multiple Correlations			
	Number of Listings Taken	*Number of Listings Sold*	*Number of Houses Sold*	*Commission Income*
Effort level	.02	.06	.03	.06
Effort level and direction: social network	.13*	.14*	.14*	.14*
Change in R^2 unique variance accounted for by direction	.11*	.08[b]	.11*	.08[b]

[a]This analysis is based on 46 participants for whom performance records were available.
[b]Contribution approaches significance at $p<.05$.
*$p<.05$

In order to evaluate the stability of these findings, parallel analyses were computed using record-based performance variables obtained from company 1. These results, summarized in Table 3, show that a direction measure, social network activity, adds significantly to the prediction of performance when level of effort is controlled in the first regression step. The multiple correlations, however, are smaller in magnitude than those presented in Table 2.

The results show that variables representing direction into which effort is channeled can contribute uniquely to the prediction of performance. Further, the results show that the same basic job of real estate representative can be performed successfully with different patterns of behavior.

Discussion

The results from this field study are consistent with Terborg's (1976, 1977) laboratory studies on motivational components. The results also lend

empirical support to recent theoretical work by Porter et al. (1975) and Naylor et al. (1980), in which performance strategies representing directional choices are emphasized.

One readily apparent weakness in the study is the absence of ability measures that may be predictors of performance. Although both companies use psychological testing and screening in the selection of sales representatives, these data were not available to the researchers. In addition, some of the variance due to ability was controlled by using only those who had been active in the industry for more than one year. It is likely that only those with adequate ability could survive in the competitive industry for that long. Thus, although it may be useful to include some measure of sales ability in the predictor of performance, there is some reason to expect less powerful effects of ability than those observed in laboratory tasks.

The differences observed between the two firms were somewhat surprising because both companies were engaged in the same industry, competing in the same markets, and hiring representatives from the same competitors. Poststudy interviews with company executives provided some insight into these differences. Both discussion with executives and review of training materials showed a strong emphasis in company 1 on developing a network of community connections early in one's career and using this network effectively to generate listings, sales or referrals. Company 2 did not share this emphasis in its training. Rather, its training was more technically oriented, with emphasis on financing and buyer qualification. This training emphasis is consistent with the importance of client selectivity for effective performance in this firm. Without the benefit of screened clients through social network connections, effective performers in company 2 must be particularly selective when choosing clients with whom to work. Training that emphasized finances and budget qualifications may make such issues the basis for this selection. Such "on the spot" screening could take the form of determining client seriousness by discussing finance plans, down payment, and cash available, and then working extensively with those found to be ready to buy or sell. The two firms appear to train and encourage their representatives to do the same basic job in very different ways.

At a more general level, understanding the behaviors that lead to successful job performance is important to both individuals and organizations. As noted by Terborg and Miller (1978), more attention should be given to defining observable behaviors that represent motivational choices and that relate to performance. Positions that require considerable effort and time before any observable performance feedback is available (i.e., long time-span discretion jobs, Mintzberg, 1973) are particularly in need of a definition of behaviors that are likely to yield successful performance eventually. Providing feedback to employees on the degree to which they exhibit these behaviors may increase the probability of their success as well as reduce levels of ambiguity.

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Coping with New Jobs: A Comparative Study of New Hires and Job Changers[1]

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Differences in coping strategies used by new hires and job changers are investigated. Job changers try harder to control and change their job situations than do new hires, who seek out more social support and more aid from others. No systematic differences were found between the two groups in the degree of palliative coping.

How employees adapt to new jobs has been discussed in both the careers literature and the job stress literature. Papers written from each perspective seldom utilize the concepts of the other perspective. This study attempts to integrate these two perspectives in order to understand how employees deal with the uncertainty and challenges that new job assignments entail. Specifically, the study investigates the differences between employees coping with a first job in an organization and employees coping with a job change within an organization (e.g., transfers and promotions). Eight hypotheses are developed about the differences in coping strategies between new hires and job changers. Empirical data testing the hypotheses are presented.

Theory

The key variable that both the stress literature and the careers literature focus on in understanding how employees adapt to new jobs and job changes is uncertainty. The stress literature suggests that when individuals are faced with new or uncertain situations—such as a new job or a job change—a series of changes in perceptions, feelings, and behaviors ensues (McGrath, 1976). People are likely to appraise cognitively the extent to which the new situation poses a threat to old valued outcomes or presents an opportunity

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to achieve new valued outcomes (Folkman & Lazarus, 1980; Lazarus, 1977). They also tend to experience aversive feelings of loss, anxiety, and lack of control (Singer, 1978). In order to respond to uncertainty and change, individuals are likely to try to establish new behavior patterns that take advantage of the opportunities and avoid the threats of the new situation (Brett, 1980; Brief, Schuler, & Van Sell, 1981) and/or emotionally distort or block out the threatening stimuli. Folkman and Lazarus (1980) refer to these two types of coping as problem-focused and emotion-focused.

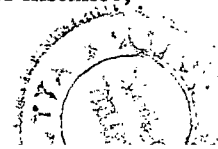
The careers literature pays similar attention to the role of uncertainty in job entry (Wanous, 1981). For instance, the research on realistic job previews suggests that individuals with unrealistic expectations about new jobs are more likely: (1) to be hired for jobs that they are not well suited for (Schein, 1978); (2) to miss the type or amount of training needed (Feldman, 1981); (3) to exhibit more anxiety about job performance (Gomersall & Myers, 1966); (4) to leave the job within the first year (Macedonia, 1969); and (5) to be less satisfied with the new job (Wanous, 1973). The uncertainty will be greatest when individuals have the least amount of information; the negative outcomes of unrealistic job previews will be greatest when the content of those expectations is most inaccurate and expectations exceed "reality."

The careers literature suggests also that new hires and job changers can deal with uncertainty emotionally as well as behaviorally. New recruits can deal with uncertainty by constructing their own version of reality and responding to their "subjective reality" as if it were "objectively" true (Louis, 1980; Van Maanen, 1978). This sense-making reduces uncertainty and provides meaning and structure to unfamiliar organizational events and features (Weick, 1977; Weiss, 1978).

Coping Strategies

If increased uncertainty and change are the key variables that create stress in new jobs, then increased predictability and control are the key goals of coping strategies. When people feel they have little hope of reducing uncertainty or reasserting control, they are much more likely to develop feelings of helplessness and depression (Janis & Mann, 1977; Wortman & Dintzer, 1978). It is not that workers do not want any challenge and arousal in their job environments (Brett & Werbel, 1980); indeed, there is substantial evidence that most individuals are energized and motivated by low to moderate amounts of stress (McGrath, 1976). However, most employees also want to be able to reestablish routines that are predictable, regain their confidence about performing well on their new jobs, and reaffirm their sense of personal control in the work setting.

This research investigates eight behavioral strategies for coping with a new job or job change. The identification of these eight strategies was influenced by the work of Beehr and Newman (1978), Brett and Werbel (1980), Werbel (1980), Levi (1967), and Folkman and Lazarus (1980). For instance,



Beehr and Newman (1978) outline four broad categories of personal coping strategies: (1) changing psychological conditions (e.g., denial or distortions); (2) changing physical conditions (e.g., diet or drug use); (3) changing behaviors (e.g., working longer hours or seeking out social support); and (4) changing the work environment (e.g., redefining the job or changing work procedures). Folkman and Lazarus (1980) use such terms as: (1) maintaining or restoring interpersonal relationships; (2) seeking information; (3) feeling better and maintaining self-esteem; and (4) making good decisions. The eight coping strategies used here consist of specific examples of the broad categories of coping strategies identified above.

1. *Work Longer Hours.* This behavioral strategy assumes that adjustment is a function of learning and that learning takes time. The strategy of working longer hours, taking less vacation time, and taking shorter lunches and/or breaks attempts to reduce the overall length of time necessary to learn the new job by increasing the amount of time on the job relative to time off the job.

2. *Change Work Procedures.* This is a work environment strategy. New job incumbents may facilitate their adjustment by utilizing procedures on the new job that they did not use on the old job. For example, the new employee may begin dictating instead of writing longhand, doing the mail once a week instead of every day, holding formal meetings with subordinates instead of informal meetings.

3. *Redefine the Job.* This work environment management strategy may facilitate adjustment by means of the employee altering the content of the job, so that the employee is doing only tasks (a) that the employee enjoys or (b) for which the employee has the skills. For example, the employee may take on additional activities that appear to be interesting and challenging and/or put less time and attention into less enjoyable activities.

4. *Delegate Responsibilities.* Using this environment management strategy, new job incumbents can simultaneously decrease the direct work demands placed on them and avoid doing less enjoyable tasks by delegating responsibilities to others. For employees at higher levels in the organization, their subordinates are the obvious people to whom to delegate work. However, even lower level managers may be able to delegate work to staff support groups, clerks, and secretaries.

5. *Get Others to Provide Task Help.* Using this behavioral strategy, new job incumbents can ask for (or be offered) help by supervisors and coworkers in accomplishing their jobs. For instance, others can pitch in to help the new job incumbent finish his or her work to meet a deadline, or they may take over a couple of additional job responsibilities until the new job incumbent knows the job better or can work faster.

6. *Seek Out Information.* This strategy of seeking information is a direct attempt to change the psychological condition of uncertainty. New jobs are seldom well-defined for employees, and there is likely to be substantial uncertainty about role expectations, performance standards, and performance–outcome contingencies. Thus, new job incumbents may try to cope

by seeking out information about performance standards, who controls evaluation, and how a positive evaluation can be obtained. Such information can help the employee learn the fastest, most effective way of working with the least anxiety.

7. *Seek Out Social Support.* This behavioral strategy is designed to reduce stress and anxiety through the affirmation of abilities from friends and colleagues. A social support network can provide an outlet for blowing-off steam, a set of people in whom to confide personal and work related problems, and a source of support for lagging self-confidence and self-esteem.

8. *Palliation.* Palliation is a coping behavior intended to reduce or eliminate anxiety and tension by distracting the subject (Lazarus, 1977). It takes two general forms: physiologically-oriented and psychologically-oriented (Brief et al., 1981). Physiologically-oriented ways of reducing anxiety associated with job stress include overindulgence in alcohol, cigarettes, sedatives, food, and sleep. Psychologically-oriented ways of dealing with stress are sense mechanisms that prevent the consciousness from having to deal with the stress and unpleasantness present in the new environment (e.g., repression and projection). People may project their failures onto others, for instance, or try to rationalize why they are performing so poorly in the new setting. In this study, the focus will be exclusively on physiologically-oriented palliation.

Hypotheses

Starting a new job may present uncertainty and induce stress among all new job incumbents. However, there are systematic differences between first jobs in organizations and transfers or promotions within organizations that should make the adjustment process quite different for job changers than for new hires. A useful framework for examining these differences is presented by Brief et al. (1981). They characterize stressful situations in terms of opportunities, constraints, and demands. Opportunities are conditions of potential gain. They provide individuals with increased chances of obtaining desired rewards and/or engaging in rewarding activities. Constraints are conditions that block or restrain. Constraints prevent individuals from obtaining desired rewards and/or engaging in rewarding activities. Demands are conditions of potential loss. In stressful situations individuals are likely to lose desired rewards and/or chances to engage in rewarding activities.

Brief et al. (1981) argue that different types of stressful situations present different opportunities, constraints, and demands. As a result of different opportunities, demands, and constraints placed on new hires and job changers, it is hypothesized here that there should be systematic differences in their coping strategies:

H1: Job changers are more likely than new hires to work longer hours to cope with their new jobs.

H2: Job changers are more likely than new hires to change work procedures to cope with their jobs.

H3: Job changers are more likely than new hires to redefine their jobs to cope with their new positions.

H4: Job changers are more likely than new hires to delegate responsibilities to cope with their new jobs.

The opportunities for job changers should be relatively high. The new jobs present chances for career advancement, personal growth, power, and influence. Job changers should have more opportunities to structure or design their own jobs and change their immediate work environments. Their new jobs allow them chances to manage more people, control more resources, use higher level skills, and become more visible in the organization.

However, demands of these new jobs are correspondingly high. Job changers' supervisors and new subordinates generally expect them to be competent and talented from the start, "to hit the floor running." This can be quite demanding for the job changers, especially for those who have taken jobs in different functional areas or have moved to a different geographical location. The higher performance expectations placed on job changers are hypothesized to make working longer hours a more necessary coping strategy for them.

New hires, in contrast, have somewhat lower opportunities than do job changers. Although frequently satisfied with their new positions, they often are surprised and disappointed by the lack of challenge their new jobs present and the lack of skill needed to do them (Webber, 1976). They also have few "idiosyncrasy credits" with which they can change their environments (Hollander, 1958). Until they have been in the organization a while and have demonstrated their attempts to influence, the work setting will be seen as less acceptable.

If the opportunities for new hires are lower, so, too, are the demands placed on them. Supervisors and co-workers generally do not expect such high levels of competence from new hires. They give them a relatively long grace period to adjust to the organization, to learn their jobs and the local norms. At least for the first couple of months, new hires are unlikely to be held accountable for the shortcomings of the work unit as a whole. Working longer hours is not seen as much as a necessary coping strategy for them.

H5: New hires are more likely than job changers to get others to provide task help to cope with new jobs.

H6: New hires are more likely than job changers to seek out information to cope with new jobs.

Although new hires are more constrained from being proactive in changing their environments than are job changers, one important opportunity new hires have is training. They are more likely to be given formal training and informal help; they often are encouraged to seek out help when they need it.

In contrast, an important constraint for job changers is the lack of training. Job changers are less likely to be seen as needing training for their new positions (Feldman, 1976). Having been promoted or given increased responsibilities, job changers already are expected to be competent or

"to pick things up as they go along." Seeking out more information may be labeled as low tolerance for ambiguity or needless dependence.

Although both these strategies—getting others to provide task help and seeking out information—are proactive, they are less "controlling" than are some of the strategies more likely to be used by job changers. Nevertheless, these strategies are quite functional for new hires because they help compensate for the inability to alter the work environment more directly, and yet they are still socially acceptable.

H7: New hires are more likely than job changers to seek out social support to cope with their new jobs.

H8: Job changers are more likely than new hires to use palliation as a coping strategy.

People often expect new hires to feel disoriented. They are working in a totally new social environment. Co-workers and friends are tolerant of new hires' self-doubts, readily offer more support to them, and are more receptive if asked for understanding.

In contrast, job changers are expected to have some social ties from previous work experiences in the organization and in the community. In addition, others often interpret the new job as an affirmation of the job changer's competence, not a threat to it. Friends and co-workers are less likely to see the need to offer or give social support to them. Moreover, job changers are constrained in what is seen as socially acceptable or desirable ways of dealing with anxiety and tension. Seeking out social support is more likely to be seen as weakness for them. Thus, job changers are hypothesized to turn to palliative coping more frequently to deal with their anxiety and tension and to seek out social support less frequently.

Method

Sample

Data were collected at a Midwestern consumer products corporation, with 80 subjects participating in the study. All were exempt employees in marketing, engineering, operations, and accounting. Of the subjects, 55 percent were new hires; 45 percent were job changers within the organization. Most of these job changes were promotions; a few were formally lateral transfers but were de facto promotions. Of the changers, 38 percent had moved geographically in order to start their new jobs.

The sample was 40 percent female and 60 percent male; 62 percent were single; 14 percent had children. Over 60 percent of the participants were 29 or younger, and only 6 percent were over 35. Of the new hires, 66 percent came directly from school. A third of the job changers had never worked for any other corporation; another third had worked for only one other company.

Data Collection

Data were collected over a 2-year period as employees were hired, promoted, and transferred within the company. Each participant was interviewed and completed a questionnaire about his or her job experiences three times: right after accepting the new job, three months later, and six months later. The data on coping strategies, on which the results of the hypotheses are reported, were collected at time 2 and time 3. The response rate of the study was 93 percent; 80 out of 86 subjects contacted participated in the research. Three nonrespondents were out of town for training the first month on the job; three nonrespondents refused to participate. No subject refused to participate for the follow-up interviews.

Measures

Closed-ended interview and questionnaire items used to measure the coping variables were adapted from Werbel (1980) and Brett and Werbel (1980). The four work environment coping strategies—change procedures, redefine job, delegate responsibility, get task help—were each measured on a 4-point closed-ended question. The items for these four environmental coping strategies appear in Exhibit 1, along with reliabilities over time.

Exhibit 1
Operationalizations and Reliabilities of Work Environment Coping Strategies

Change procedures. In order to become adjusted to a new job some people change job procedures. Have you changed job procedures a lot, some, a little, not at all? ($r_{2,3} = .16$, ns)
Redefine job. Have you changed the tasks that are part of your job a lot, some, a little, not at all? ($r_{2,3} = .16$, ns)
Delegate responsibilities. Have you been able to delegate responsibilities to others a lot, some, a little, not at all? ($r_{2,3} = .62$, $p \leq .01$)
Get task help. How much help on your new job have you received from others? A lot, some, a little, none? ($r_{2,3} = .47$, $p \leq .01$)

Delegating responsibilities and getting task help show substantial reliability over time ($r_{2,3} = .62$, $p \leq .01$, and $r_{2,3} = .47$, $p \leq .01$, respectively). Some of the consistency of the delegation scale is probably due to the availability of obvious subordinates for higher level managers to delegate to, though some employees without formal supervisory authority were still able to delegate some of their work to others (e.g., staff support groups or secretaries).

The lack of reliability over time for changing procedures ($r_{2,3} = .16$, ns) and redefining the job ($r_{2,3} = .16$, ns) indicates that employees who utilize these environmental coping strategies early in their new jobs do not use them again in the second three months period. Employees who do not use these strategies initially are more likely to use them later.

The work-longer-hours variable was measured by taking the difference between the hours the employee expected to work on the new job measured at time 1 and the hours the employee reported actually working in the new

Table 1
Intercorrelations Among Coping Strategies[a]

	Work Longer Hours	*Change Work Procedures*	*Redefine Job*	*Delegate Responsibilities*	*Get Task Help*	*Seek Information*			*Seek Social Support*	*Palliation*
						Job	*Co-Workers*	*Performance Appraisal*		
Work longer hours	.71**	−.12	.01	.06	.28*	.40**	.49**	.27*	.34**	.00
Change work procedures	−.30*	.16	.27*	.25*	−.03	−.16	−.06	.01	−.03	−.05
Redefine job	−.28*	.43**	.16	.18	−.11	−.12	.04	.03	−.11	−.07
Delegate	.05	.12	.14	.62**	−.15	−.14	.06	.04	−.01	−.00
Get task help	.39**	−.07	−.14	−.26*	.47**	.45**	.39**	.42**	.31**	.20
Seek information										
Job	.29*	−.03	.07	−.12	.43**	.57**	.38**	.77**	.54**	.17
Co-workers	.21*	−.07	−.06	.14	.17	.52**	.61**	.43**	.47**	.16
Performance appraisal	.26*	.04	.10	−.08	.33*	.82**	.52**	.40**	.62**	.23*
Seek social support	.34*	−.13	−.08	−.04	.20	.52**	.37**	.55**	.47**	.23*
Palliation	−.08	−.02	.07	.12	.02	.11	.09	.04	.00	.71**

[a]Underlining shows diagonal. Entries along the diagonal are time 2, time 3 correlations; entries below the diagonal are time 2 intercorrelations; entries above the diagonal are time 3 intercorrelations.

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

job at time 2 and then again at time 3. Intercorrelations of all the coping strategy variables over time appear in Table 1. The correlation between "work longer hours" times 2 and 3 was high, .71 ($p < .01$).

Information seeking about job duties, co-workers, and performance appraisal was measured in the following manner. Employees were asked, "In the last three months, how much have you talked with your spouse (new boss, friends) about (each of the information seeking topics)?" Subjects answered on a 4-point scale: a lot, some, little, not at all. Each variable was formed by summing the amount of information seeking across sources and dividing by the number of sources. The resulting variable was distributed within a 4-point range. These measures were quite reliable over time; the time 2, time 3 intercorrelations for job duties, co-workers, and performance appraisal were .57, .61, and .40, respectively, and were all significant at the .01 level. There also are high correlations among the different information seeking variables. At least in this sample, employees did not seek information discriminatingly.

The social support variable was formed in a manner similar to the information-seeking variable. Each subject was asked how much he or she had talked to each of the three sources about the subject's ability to do the new job. Subjects answered on a 4-point scale: a lot, some, a little, not at all. Subjects' answers were summed across sources of social support and divided by the number of sources who had provided support. There also is substantial reliability over time of this variable ($r = .47$, $p \leq .01$).

Consistent with Brett and Werbel (1980), no internal consistency reliability coefficients are reported for these last two coping strategies (information seeking and social support). It is not appropriate to compute such coefficients for these indices because not all the sources of information (or support) are relevant to all subjects.

Palliation was measured by a set of six questions answered on 4-point scales (a lot, some, a little, not at all). The questions asked subjects how much over the last three months they took pills to calm themselves, smoked more than usual, drank more alcohol than usual, gained weight, took sleeping pills, and lost weight. Gurin, Veroff, and Feld (1960) used some of these items in the first Institute for Survey Research (ISR) mental health survey. They have been adapted here on the basis of the conceptualization and empirical results of Brett and Werbel (1980) and Werbel (1980). The possible range for the palliation scale was from 6 to 24 points.

At time 1 the coefficient alpha of reliability for palliation was .84, but at time 2 and time 3 the coefficient alpha dropped drastically to .38 and .52, respectively. A high level of palliation, in which an employee engages in multiple types of palliation, probably is a short term coping strategy used to get over ad hoc "crises" (White, 1974). In this study the high internal consistency at time 1 suggests that multiple forms of palliation were being used. The low internal consistency at times 2 and 3 suggests that employees had settled down to their own personal patterns.

The time 2, time 3 intercorrelation (.71, $p \leq .01$) in Table 1 suggests that palliation was stable in the sample at the three and six month periods. Employees who had engaged in palliation during the first three months of adjustment were still engaged in it during the second three months.

Data Analysis

Because of the degree of intercorrelation among the information-seeking variables, multivariate analysis was used to test all hypotheses simultaneously. Specifically, a one-way multivariate analysis of variance was run using the SPSS MANOVA program as adapted for CDC computers (Cohen & Burns, 1977). A one-way MANOVA is equivalent to discriminant analysis or multiple linear regression with a dichotomous dependent variable and is a special case of canonical correlation (Bock, 1975). Separate analyses were run for time 2 and time 3 data to preserve degrees of freedom due to the relatively small sample size. Thus, the time 3 analysis can be considered a nonindependent replication. There were no distinct hypotheses for time 2 and time 3.

One-tailed univariate *F*-tests are presented for each hypothesis. Step-down *F*-tests indicate whether an individual coping strategy accounted for significant, and unique, variance from other strategies with which it might be intercorrelated. Because there were no hypotheses about the uniqueness of individual coping strategies, variables were entered in the order in which they were developed in the hypothesis section. Finally, correlations between the dependent variables (coping strategies) and canonical variates are presented. These correlations, known as structure correlations (Cooley & Lohnes, 1971), show the relationships between the dependent variables and the canonical variates (the linear combination of dependent variables that maximally differentiates the new hires from job changers).

Results

Tables 2 and 3 present, for three months and six months, respectively, the means and standard deviations for new hires and job changers on each coping strategy variable. These tables also include the univariate *F* tests and the step-down *F*-tests.

The univariate *F*-tests suggest that Hypotheses 1, 4, 5, and 7 were supported. Job changers are more likely than new hires to cope by working longer hours and delegating more responsibilities. New hires are more likely to cope by seeking out social support and getting task help.

Hypothesis 6 was partially supported by the data. New hires are more likely to seek out information about job duties and performance appraisal than are job changers. (New hires also are more likely to seek out information about co-workers, although the differences between them and job changers here are not significant.)

Table 2
Coping Strategies of New Hires and Job Changers After Three Months

	New Hires (N=46)		*Job Changers (N=34)*		*Univariate*		*Structure*
	$\bar{X}$	*SD*	$\bar{X}$	*SD*	*F*	*Step F*	*Correlation*[a]
Work longer hours	1.93	5.13	-3.00	5.49	19.22**	19.22**	-.52
Change work procedures	1.97	.96	2.40	1.04	ns	ns	.28
Redefine job	1.91	1.06	2.37	1.12	4.54*	ns	.25
Delegate responsibilities	1.89	.87	2.66	1.10	13.74**	18.05**	.44
Get task help	3.32	.82	2.66	.99	16.25**	ns	-.48
Seek information, job	3.23	.64	2.53	.63	21.48**	10.31**	-.55
Seek information, co-workers	2.94	.64	2.68	.75	ns	ns	-.19
Seek information, performance appraisal	2.56	.64	2.03	.52	14.74**	ns	-.45
Seek social support	2.37	.66	1.80	.63	14.01**	ns	-.44
Palliation	7.35	1.53	7.46	1.66	ns	ns	.05
Multivariate $F=6.29$**	Canonical Correlation = .76**				Estimated omega squared[b] = .49 Corrected for small samples = .28		

[a]Correlations between dependent and canonical variates.
[b]Omega squared is the variance in coping strategies attributable to group differences (Tatsuoka, 1973).
*$p \leq .025$
**$p \leq .005$

Table 3
Coping Strategies of New Hires and Job Changers After Six Months

	New Hires (N=46)		*Job Changers (N=34)*		*Univariate*		*Structure*
	$\bar{X}$	*SD*	$\bar{X}$	*SD*	*F*	*Step F*	*Correlation*[a]
Work longer hours	4.25	6.44	-3.14	6.75	20.62**	20.62**	-.64
Change work procedures	2.07	.93	2.55	1.09	ns	ns	.26
Redefine job	1.87	.98	2.27	1.22	ns	ns	.23
Delegate responsibilities	2.28	.94	2.89	1.04	6.94**	8.63**	.37
Get task help	3.23	.84	2.68	1.07	5.47*	ns	-.33
Seek information, job	3.12	.68	2.64	.76	7.01**	ns	-.37
Seek information, co-workers	3.05	.69	2.76	.67	ns	ns	-.23
Seek information, performance appraisal	2.58	.70	2.29	.68	ns	ns	-.23
Seek social support	2.53	.66	2.01	.74	9.46**	ns	-.43
Palliation	7.92	2.08	7.51	1.76	ns	ns	-.10
Multivariate $F=4.32$**	Canonical Correlation = .66**				Estimated omega squared[b] = .42 Corrected for small samples = .18		

[a]Correlations between dependent and canonical variates.
[b]Omega squared is the variance in coping strategies attributable to group differences (Tatsuoka, 1973).
*$p \leq .025$
**$p \leq .005$

Hypotheses 2, 3, and 8 were not supported by the data. Job changers do change work procedures and redefine the job more often than do new hires, but the differences between the two groups are not statistically significant. There are no systematic differences between new hires and job changers in the degree of palliative coping.

The results are very stable over time. Job changers' unexpectedly high level of effort (working longer hours) continues six months after the new job began, but new hires are working substantially less six months after the new job began than they expected. Although new hires are beginning to be able to delegate responsibility at the six month period, they still are delegating significantly less than job changers. New hires also are getting about the same level of help from others six months into the new job as they were three months into the new job. Job changers also are getting the same amount of help from others as they were three months previously, but this help is substantially less than that received by new hires.

New hires are continuing with their relatively high level of information search at the six month period. Job changers' level of information search remains stable and significantly less than that of new hires. Job changers are seeking a little more social support at the six month period than they did initially, but their social support seeking is still substantially less than that of new hires. The only difference that did not hold up over time was with respect to seeking information about performance appraisal. At the six month measurement, job changers are beginning to seek information about performance appraisal that they were not seeking previously.

The step-down *F*'s paired with the correlations in Table 1 indicate behavioral similarities in conceptually different coping strategies. At three months, employees who work longer hours also are likely to change procedures and redefine the job. Employees who delegate do not get task help. Employees who seek information about job duties tend to seek it about co-workers, performance appraisal, and get social support. At six months, employees who work shorter hours than expected are the ones seeking information and social support and getting task help. At six months, delegation remains a unique coping strategy that differentiates job changers and new hires.

The structure correlations between the dependent variables and the canonical variates, also presented in Tables 2 and 3, show that the major difference between new hires and job changers at three and six months has to do with level of effort. Job changers were working much longer hours than they had expected; new hires were working fewer hours than expected. The structure correlations also show that at three months, overall differences between new hires and job changers are more highly associated with delegation, getting task help, seeking information about the job, performance appraisal, and seeking social support. These variables (except social support) are not quite as highly related to overall differences between new hires and job changers at six months.

The multivariate *F*-tests are presented in Table 2 for the three-month period, and in Table 3 for the six-month period. The significant canonical correlations at three months and six months were .71 and .66, respectively, suggesting that new hire coping strategies were only slightly more similar to those of the job changers at six months than their strategies were at three months. The variance in the set of dependent variables accounted for by

differences between new hires and job changers at three months was 49 percent and at six months was 42 percent. These figures were computed from the statistical formula for omega squared (Tatsuoka, 1973).

Discussion

The results suggest that new jobs and job changes do create uncertainty for employees. Employees are likely to try to establish new behavior patterns that take advantage of the opportunities and avoid the threats of the new situations. Moreover, both new hires and job changers can cope with new jobs with palliation as well as with behavioral coping strategies.

There are important differences in the ways in which new hires and job changers cope with their new positions. As a result of different career and organizational opportunities, constraints, and demands, there are systematic differences in the coping strategies of the two groups. In general, job changers favor strategies that involve higher activity levels for themselves and more control of others. In contrast, new hires favor strategies that solicit the aid and social support of others. Job changers generally have more opportunities to structure and change their work environments, but they also have higher performance expectations placed upon them. New hires, in contrast, have less power with which to change their work environments, but they are more likely to be seen as needing training and social support. As Folkman and Lazarus (1980) suggest, choice of coping strategy is determined by the relationship between the person *and* the environment rather than by independent person or situation factors.

Also consistent with Folkman and Lazarus' results, there is a high degree of consistency in coping strategies. In the present research, the differences in coping strategies between new hires and job changers appear to be stable over the initial six month socialization/resocialization period. Only with respect to seeking performance appraisal information is a noticeable increase in activity observed in job changers at the six month point. This is likely due to the increased salience of the probationary review at the six month mark.

Further research on the use of coping strategies over longer periods of time is needed. It is important to discover whether these same coping strategies continue to be used to take advantage of job opportunities and to avoid job threats even one year after taking a new job. Additional work is needed, too, to discover the effectiveness of these coping strategies in increasing employee satisfaction and individual performance.

Greater attention needs to be paid to the relationship between what individuals do to cope with unfamiliar situations and what organizations do to facilitate individuals' adjustment. The response to a situation that defies familiar ways of behaving and requires the production of new behavior is called coping when the agent is an individual (White, 1974) and socialization when the agent is the organization (Van Maanen & Schein, 1979). At this point, very little is known about how the socialization practices of an

organization evoke individual coping strategies, or how individual coping strategies influence organizational socialization programs.

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The Interaction of Job Stress and Social Support: A Strong Inference Investigation[1]

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A comparative examination was made of three alternative hypotheses (buffer, coping, no interaction) predicting job outcomes by job stress and social support. For role ambiguity, little evidence of interaction effects was found. For role conflict, supportive evidence was found for the coping hypothesis, but not the buffer hypothesis, on the work and supervisory satisfaction facets.

Job stress, and its relationship to both individual and organizational outcomes, has become an increasingly important area of study in recent years. Role characteristics, specifically role conflict and role ambiguity, have been cited frequently as sources of job-related stress and have been found to be related to numerous negative attitudinal and behavioral outcomes (Brief & Aldag, 1976; Szilagyi, Sims, & Keller, 1976). Because of the generally adverse personal and organizational outcomes of role conflict and role ambiguity, and the concurrent difficulty of eliminating these stressors from organizations, increased attention has been given to the exploration of variables that might moderate the role stress–role strain relationship, thus reducing negative health and job outcomes. One such variable that has stimulated increasing interest among organizational researchers is that of social support (Beehr, 1976; Blau, 1981; LaRocco & Jones, 1978; LaRocco, House, & French, 1980).

Interest in on-the-job stress was stimulated by research funded by the National Institute for Occupational Safety and Health (Caplan, Cobb, French, Van Harrison, & Pinneau, 1975). These researchers, working at

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the University of Michigan's Institute for Social Research (ISR), articulated the "buffer hypothesis" and refined the operationalization of social support. The buffer hypothesis explains interactions between stress and support by proposing that the relationship between stress and strain will be weaker for those enjoying a high degree of social support. Social support was conceptualized as including both the helpful activities of others and the ease of communications with others. The ISR researchers differentiated the supervisor, others at work, and people at home as distinct sources of such support. Pinneau (1975) found that social support had both direct effects on strain reduction and interaction effects with stress on strain, but he concluded that the inconsistency of the nature of the significant interaction effects refuted the buffer hypothesis.

Subsequent work cast additional doubt on the notion that job stress would have less negative effects for individuals with high social support. Beehr (1976) studied supervisory support, group cohesiveness, and autonomy of moderators of the negative outcomes of role ambiguity. Results were mixed and inconsistent. LaRocco and Jones (1978) examined leader facilitation and work group cooperation as moderators of the relationship between a composite ambiguity and conflict measure and job satisfaction. They found little support for the buffer hypothesis, but clear evidence of direct relationships between these support variables and satisfaction. LaRocco and Jones reported that leader support was more closely related to specific job satisfaction measures and that co-worker support was more relevant to overall satisfaction with the organization. They suggested that future research should explore differential effects of stress and support on various facets of job satisfaction.

Conflicting evidence kept the issue alive. House and Wells (1978) found evidence for buffer effects with leader support, but not with co-worker support. These researchers criticized Pinneau's (1975) earlier analysis as being overly biased against significant moderator effects. LaRocco et al. (1980) reanalyzed Pinneau's data using hierarchical moderated regression. They found evidence for buffering effects on specific mental and physical health outcomes but not on general job strains (i.e., dissatisfaction). Citing the inconsistency of findings, Blau (1981) addressed the buffer hypothesis as part of an investigation of the person-environment fit model of job stress (French, Rogers, & Cobb, 1974). Blau concluded that the frequency of significant interaction effects in his study was not greater than that to be expected due to Type I error.

Several distinctions are relevant in attempting to summarize the research on social support. Various operationalizations of social support have been used. Most of the studies have assessed support from specific sources, that is, the supervisor and the co-workers; yet some have ignored support from family or friends (Beehr, 1976; LaRocco & Jones, 1978). Little consistency can be noted across the studies in respect to the operationalization of stress. Most of the authors, however, emphasized role characteristics. Many of the studies used general job satisfaction measures as the outcome measures

of primary interest, but most of the evidence supporting the existence of moderating effects has occurred when more specific outcomes were studied (Gore, 1973; LaRocco et al., 1980).

These studies of job stress and social support could be considered constructive replications in only a loose sense of the term. To the extent that overall patterns may be discerned, it is clear that job stress has been found to have a generally unfavorable impact on workers and that social support has been found to have a generally favorable impact on workers. The interaction of stress and support remains unclear. Over the series of studies reviewed, the occurrence of interaction effects is hardly pervasive, yet enough significant interaction findings have been reported to maintain this line of research. Rather than adopt a simplistic "scoreboard" approach to enable some conclusions to be reached, it is suggested that the inconsistency of the findings is a likely product of the wide variation in the operationalization of stress and support variables.

Another important consideration may be the model, inexplicit as it may be, that has guided this research. In addressing the question of whether social support may buffer the effects of stress, researchers have been looking for interaction effects of a particular nature. Significant interactions between stress and support often have been unlike those predicted by the buffer hypothesis (Beehr, 1976; Blau, 1981; Pinneau, 1975). Therefore, new concepts may be necessary to understand the simultaneous effects of stress and support. One such idea is suggested by Lin, Ensel, Simeone, and Kuo (1979) in a study on life stress, social support, and illness symptoms. Their findings indicated no support for the hypothesis that the relation of stress to illness was a function of the level of social support. Rather, they concluded that the relationship between support and illness was more likely to be a function of the level of stress. The latter perspective is more consistent with the notion of social support as a coping mechanism that individuals would be more likely to use under stressful conditions. Indeed, such a perspective is consistent with conceptualizations of support often suggested by life stress and family stress researchers (Jenkins, 1979; Unger & Powell, 1980). Jenkins (1979) categorized the enlistment of social supports as an adaptive defensive reaction by individuals undergoing a stressful event and experiencing an alarm reaction (e.g., anxiety, fear, depression) that signals the need for stress-reducing action. Thus, for persons experiencing very low levels of stress, the enlistment of this resource would be unnecessary. In a similar vein, Unger and Powell stated that "the key question is not whether social networks provide support, but when and under what conditions are social networks a means of support?" (1980, p. 570).

The present study extended the cited research on the simultaneous effects of stress and support by: (1) focusing on explicit support from four sources: the immediate supervisor, the departmental manager, co-workers, and the family and friends of the worker; (2) examining the specific role characteristics of role ambiguity and role conflict as stressors; (3) assessing four specific facets of job satisfaction in addition to general job satisfaction;

and (4) using multiple alternative hypotheses (Platt, 1964). Three plausible alternative hypotheses can be stated, based on the literature reviewed:

1. The simultaneous effects of stress and support on job satisfaction are simply additive (no interactions).

2. Stress and support interact such that:

a. Stress will be negatively related to satisfaction for those with low social support, but unrelated for those with high social support (the buffer hypothesis).

b. Support will be positively related to satisfaction for those reporting high stress, but unrelated for those reporting low stress (the coping hypothesis).

The difference between the buffer hypothesis and the coping hypothesis is simply the pattern of the interaction predicted. The preferred method of testing the statistical significance of interactions, hierarchical regression analysis (Cohen & Cohen, 1975), reflects no distinction between patterns of interaction. Either of these two particular patterns, as well as patterns involving both positive and negative associations, could be found to represent the complex association of three variables. It also should be noted that none of the hypotheses involves causal attribution or time ordering of the variables.

Method

Setting and Sample

The research site was a large federal government agency. The organization processes information specific to clients on forms originating from both the clients and other branches of the agency. The branch of the organization used in this study was composed of nine work units ranging in size from 12 to 20 workers. With the exception of a clerical support unit and individual unit clerks, all workers shared the same job title and job description. The branch manager, the nine unit managers, and all employees classified by the job title of clerk were excluded from the sample, yielding a sample of 104 respondents.

The respondents were predominantly female and typically had a high school education. Ages ranged from early twenties to the sixties. The racial composition was mixed, with somewhat more Caucasians than Blacks.

Procedure

Data collection was conducted on site, during working hours. Respondents completed questionnaire measures in a large room away from the work area. Participation was voluntary, confidentiality of the study was stressed, and fewer than five employees failed to provide usable data.

Measures

Social support was measured with the instrument developed by ISR (Pinneau, 1975). Four items assess the extent to which others make worklife easier, are easy to talk to, will help when things get tough, and are willing to listen to personal problems. Each of the four items was asked in reference to each of four possible sources: the branch manager, the unit manager, co-workers, and family friends. The four items were summed for each source, yielding scales with internal consistencies (Cronbach's alpha) of, respectively, $\alpha = .91, .79, .53$, and .76. The reliability estimate of co-worker support, although notably lower than the estimates for the other sources, was not taken to be problematic. Nunnally's (1967) recommendation for standards of reliability in early stages of research on hypothesized measures of a construct is that modest reliabilities of $\alpha = .50$ to $\alpha = .60$ will suffice. Only two published papers have used this measure, and both report its reliability as being above $\alpha = .72$. It may be that the differences are due to sampling error.

Role ambiguity and role conflict were assessed with scales developed by Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964). The role ambiguity scale consisted of four items and had internal consistency of $\alpha = .80$. The role conflict scale consisted of three items and had reliability of $\alpha = .78$.

Job satisfaction facets were measured with the Role Orientation Index (Graen, Dansereau, & Minami, 1972), which is an adaptation of the Job Descriptive Index (Smith, Kendall, & Hulin, 1969). The four facets measured were satisfaction with work, supervision, pay, and promotions. Internal consistencies were, respectively, $\alpha = .79, .83, .81$, and .86. Overall job satisfaction was assessed with Hoppock's (1935) general satisfaction scale. Its reliability was $\alpha = .78$.

Analyses

The means, standard deviations, and intercorrelations of all the scales were computed. Moderated multiple regression (Zedeck, 1971) was used to test the main effects and interactions of social support sources with role stress on job satisfaction outcomes. Separate analyses were done on the two role stress variables, role ambiguity and role conflict. In this procedure, hierarchical regression is used initially to assess the relation of one of the role stress variables to one of the satisfaction variables. Second, one of the social support source variables is forced to enter the regression equation as the second predictor. Finally, the multiplicative interaction term (stress $\times$ support) is forced to enter the regression equation as the third variable.

The test of the incremental variance accounted as attributable to the multiplicative interaction term is the critical statistical test for the stated hypotheses. If Hypothesis 1, no interaction, could be ruled out, visual examination of the pattern of the interaction was used to assess whether it fit Hypothesis

2a or Hypothesis 2b. For Hypothesis 2a, the buffer hypothesis, regressions of satisfaction on stress were examined within high and low support subgroups. These subgroups were obtained by dichotomizing the sample by the median value of the relevant support variable. For Hypothesis 2b, the coping hypothesis, regressions of satisfaction on support were examined within high and low stress subgroups. These subgroups were formed by dichotomizing the sample by the median values of the stress variables.

Results

The means, standard deviations, and intercorrelations of the measures used are presented in Table 1. Role ambiguity and role conflict display the expected pattern of negative correlations with the four sources of support and the five satisfaction measures. For ambiguity, the correlations reached significance for overall satisfaction, branch manager support, and unit manager support. Conflict was significantly related to work satisfaction and co-worker support. The intercorrelation of conflict and ambiguity was significant, yet moderate in strength. The support measures and the satisfaction measures generally displayed positive correlations. Notable among those statistics are the relatively high correlations between co-worker and family and friend support, as well as between work satisfaction and overall satisfaction. The relatively low correlations between overall satisfaction and other facets are consistent with the findings of Ferratt (1981) that overall satisfaction is not simply a composite of satisfaction facets.

In the hierarchical regression analyses for role ambiguity, four significant direct effects were found, but only one significant interaction effect was found. Social support from family and friends was the only support variable to add significantly to the prediction of overall satisfaction by ambiguity ($\Delta R^2 = .043$, $F = 5.11$). Support from co-workers increased the prediction of both work satisfaction ($\Delta R^2 = .077$, $F = 8.66$) and supervisory satisfaction ($\Delta R^2 = .055$, $F = 6.00$). By far, the strongest direct effect was found for unit manager support on supervisory satisfaction, as should be expected ($\Delta R^2 = .422$, $F = 76.39$). The only support source that had no direct effect on any satisfaction variable was branch manager support. Neither stress nor support contributed significantly to the prediction of satisfaction with either pay or promotion. The one significant interaction effect between ambiguity and satisfaction was found for branch manager support in the prediction of work satisfaction ($\Delta R^2 = .062$, $F = 6.94$). For role ambiguity the results were more supportive of the direct effects hypothesis, rather than either interaction hypothesis.

For role conflict, four direct effects and five interaction effects were found to be significant. Each of the support sources had a single significant direct effect. Support from both the branch manager ($\Delta R^2 = .042$, $F = 4.55$) and family and friends ($\Delta R^2 = .047$, $F = 5.12$) added significantly to the prediction of overall satisfaction by role conflict. Unit manager support ($\Delta R^2 = .434$, $F = 78.87$) and co-worker support ($\Delta R^2 = .049$, $F = 5.20$) were

Table 1
Correlations Among the Stress, Support, and Outcome Measures ($N = 104$)

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*M*	*SD*
1. Overall satisfaction	—											19.039	3.078
2. Work satisfaction	.544*	—										15.202	2.964
3. Supervisory satisfaction	.156	.157	—									18.058	3.262
4. Satisfaction with promotions	.281*	.368*	.091	—								12.865	4.188
5. Satisfaction with pay	.107	.162	−.009	.450*	—							7.048	2.690
6. Branch manager support	.226*	.146	.099	.049	.180	—						8.423	5.807
7. Unit manager support	.112	.146	.664*	.111	.039	.392*	—					12.135	3.034
8. Co-worker support	.155	.283*	.239*	.121	.159	.237*	.297*	—				13.596	1.883
9. Family and friends support	.238*	.177	.173	.090	.055	.198*	.198*	.563*	—			13.750	2.561
10. Role ambiguity	−.315*	−.171	−.138	−.061	−.148	−.220*	−.205*	−.036	−.097	—		10.154	2.828
11. Role conflict	−.159	−.372*	−.097	.024	−.076	−.148	−.074	−.310*	−.146	.322*	—	5.298	2.389

*$p < .05$

directly related to supervisory satisfaction. None of the support sources added significantly to the prediction of work, pay, or promotion facets of satisfaction by conflict.

The role conflict analysis showed consistent interaction effects. All four support sources significantly moderated the prediction of supervisory satisfaction by conflict (branch manager: $\Delta R^2 = .042$, $F = 4.46$; unit manager: $\Delta R^2 = .034$, $F = 6.43$; co-workers: $\Delta R^2 = .062$, $F = 7.09$; family and friends: $\Delta R^2 = .063$, $F = 6.99$). With respect to role conflict and supervisory satisfaction, the direct effects hypothesis was not adequate. Also, as for role ambiguity, a significant interaction effect was found between branch manager support and work satisfaction for conflict ($\Delta R^2 = .071$, $F = 9.07$). The proportion of variance attributable to these effects is modest in all cases, but no more modest than the size of the direct effects, with the notable exception of the very strong relationship between unit manager support and supervisory satisfaction. The modest size of these effects is entirely consistent with the magnitude of interaction effects generally reported in the organizational behavior literature if hierarchical regression tests have been used. Such tests are appropriately conservative in that only that portion of the variance of an interaction term that is unrelated to either of the main effects terms can be identified as uniquely accounting for criterion variance.

For the six significant interactions, regression plots of satisfaction on stress within high and low support subgroups were inspected for the pattern predicted by the buffer hypothesis; that is, role stress is negatively related to satisfaction for those lacking support, but unrelated for those experiencing support. This predicted pattern was observable in only one case. In four of the other five plots, the interaction appeared to be due at least partially to a positive association, with these slopes ranging from $b = +.12$ to $b = +.23$, between stress and satisfaction for the high support group. For the same cases in the low support group, slopes ranged from $b = -.24$ to $b = -.39$. In such cases the buffer hypothesis is not supported.

Regression plots of satisfaction on support within high and low stress subgroups for the same six significant interactions then were examined. In five of the six cases, satisfaction was related to social support for those experiencing a high degree of stress (slopes ranged from $b = +.32$ to $b = +1.8$), but not for those reporting a low degree of stress (slopes ranged from $b = .0$ to $b = +.06$). For those not experiencing stress due to role conflict, these interactions showed that social support was inconsequential for these outcomes. However, for those having to cope with role conflict, job satisfaction was predicted by social support. For illustration, regression lines for two of these interactions are reproduced in Figure 1. In the sixth case, the relationship between support from the supervisor and satisfaction with the supervisor was positive and significant in both subgroups, but it was greater in the high role conflict subgroup than in the low role conflict subgroup.

enlisted for coping with occupational stress. For unit manager support, the evidence supported direct effects more than interaction effects. Specifically, in both the conflict and the ambiguity analysis, unit manager support was directly and strongly related to supervisory satisfaction, but not to other facets. These two direct effects were far stronger than any other relationships found in this study. Co-worker support showed the same pattern of direct and interaction effects on supervisory satisfaction as did unit manager support, but the magnitude of co-worker direct effects was no greater than the size of its lone interaction effect. The final source used in this study, support from family and friends, appeared to be indistinct from co-worker support considering the zero-order intercorrelation and coincidental interaction effects. However, a clear pattern distinguishing these two sources arose from the regression analysis. For both ambiguity and conflict, family and friend support was directly related to overall satisfaction; co-worker support was not. Co-worker support showed consistently stronger, although modest, relationships to the work and supervision satisfaction facets than did family and friend support. Because the four sources showed different patterns of direct and moderating effects, some of the inconsistent results from previous studies may have been due to lack of specificity in differentiating between sources of support.

The pattern of findings in the comparison of direct and moderating effects of social support also speaks to the inconsistency of previous research. Interaction effects were nearly as common as direct effects in this study. However, all but one of the interaction effects were found in the role conflict analysis, and an equal number of direct effects was found in the role conflict and role ambiguity analyses. If social support is more likely to play an interactive role in conflict-outcome relationships than ambiguity-outcome relationships, then the inconsistent finding of interaction effects in some previous studies is more easily explainable. LaRocco and Jones (1978), for example, used a composite role stress variable including items assessing both conflict and ambiguity. Beehr (1976) tested for moderating effects on role ambiguity only. He did not examine conflict. Because role conflict depends on discrepancies arising in role relations and because ambiguity may be inherent in the task itself, it may be that personally supportive interaction has greater impact on stress due to conflict than on stress due to ambiguity.

Just as the explicit specification of both the source of support and the type of role stress ordered the finding of interaction effects in these data, so did the specification of facets of job satisfaction. Supervisory satisfaction was the outcome for which most of the significant interactions were found. Four interaction effects were found for this facet of satisfaction; two were found for the work satisfaction facet. No significant interaction effects were found for overall satisfaction, pay satisfaction, or promotion satisfaction. The concentration of interaction effects on these two specific facets of the job, satisfaction with the supervisor and with the work itself, is easily explainable. It is precisely these aspects of jobs that involve the personal interaction of individuals in role relations. Again, the failure of

previous research to find consistent interaction effects on general job satisfaction may have led researchers to conclude falsely that stress and support do not interact.

The LaRocco et al. (1980) study is notable in this respect. Their three job outcome measures were job dissatisfaction, boredom, and workload dissatisfaction. Only workload dissatisfaction is conceptually close to satisfaction with the work itself as a specific facet of job satisfaction. The LaRocco et al. study found significant interactions on workload dissatisfaction for both social support from co-workers and social support from family and friends with role conflict as the stress variable. However, these authors summarized their results across five stress variables, three support sources, and three outcome measures. With 45 tests taken as a pool, their conclusion was that the proportion of significant interactions is not clearly more than would occur by chance. A review of the results of the LaRocco et al. study in conjunction with the present study indicates that a meaningful concentration of interaction effects occurs with role conflict and specific satisfaction facets. This concentration supports the conclusion that the evidence against interaction effects may be taken as unequivocal for general job satisfaction but not for the facets of work and supervision, and for role ambiguity but not for role conflict.

The nature of the significant interaction effects indicates the inadequacy of the buffer hypothesis. The coping hypothesis is much more consistent with the interactions observed. Further, the coping hypothesis as an explanation of stress × support interactions is more consistent with the notion that supportive relationships provide a strategy for dealing with job stress. Social support may be of lesser concern to individuals not experiencing a significant amount of stress. For such individuals job satisfaction may be more a function of other characteristics of work.

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Causal Attributions, Affect, and Expectations for a Day's Work Performance

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Two studies were conducted to explore the relationships between perceived job performance, causal attributions, employee affect, and expectations for a day's work. In both studies, causal categories derived from previous attribution research were found to correspond with employee job explanations. However, results somewhat inconsistent with previous laboratory studies were obtained.

Weiner (1979, 1980) has argued that causal beliefs determine affective reactions to perceived levels of task performance and beliefs about the probability of future success on the same or similar tasks. When extended to organizations, this suggests that causal beliefs might be influential in determining employee emotional and motivational states. Unfortunately, little empirical research has been conducted to explore employee job attributions. Campbell and Pritchard (1976) and Chacko, Stone, and Brief (1979) discussed the usefulness of an attributional approach to employee motivation but offered no evidence to substantiate their arguments. Bougon, Weick, and Binkhorst (1977) investigated the causal reasoning of organizational actors but did not examine its affective implications. The study by Porac, Nottenburg, and Eggert (1981) failed to link causal beliefs and affect to immediate task perceptions. Some theorists have outlined the attributional substrates of leadership perceptions (Calder, 1977; Rush, Phillips, & Lord, 1981) and leader behavior (Green & Mitchell, 1979; Knowlton & Mitchell, 1980; Mitchell & Wood, 1980), but these are not directly pertinent to employee motivation.

The two studies reported below were conducted to explore the nature and correlates of employee causal attributions. Three general questions were addressed. First, analyses were conducted to determine (a) whether employees retrospectively perceive *any* causal variables to have affected their

work performance, and (b) the types of causal variables (if any) perceived to have been important. Many experienced employees perform their work with highly routinized behavioral patterns and thus may not engage in much causal reasoning simply because work has become "scripted" (Langer, 1978). Indeed, evidence exists suggesting that causal reasoning occurs only when unexpected or novel events take place (Pyszczynski & Greenberg, 1981). If employees do engage in causal reasoning, an additional issue is whether the set of causal variables provided to them adequately captures their causal perceptions. Weiner, Frieze, Kukla, Reed, Rest, and Rosenbaum (1971) proposed that task attributions involve ability, luck, immediate task effort, and task difficulty. More recently, Weiner (1979) proposed a set of causes relevant to school performance that incorporated mood, teacher bias, help from other students, and stable (as opposed to unstable) effort. In the present studies, these eight variables were modified to reflect organizational causes, and employees were asked to rate their importance in determining job performance. In addition, attempts were made to determine if other causal variables were perceived to have been important.

A second concern of the present research was the relationship between perceived performance and employee causal beliefs. Several researchers have observed that individuals make socially desirable internal attributions for perceived success but they externalize perceived failure (Bradley, 1978; Zuckerman, 1979). Critical incidents obtained from employees suggest that this tendency might also exist in organizations (Adler, 1980). Thus, perceived work success might relate positively to causal internality. On the other hand, some researchers have noted that performance interacts with individual difference variables. Kukla (1972) observed that high achievers attributed task success more to ability than did low achievers. Conversely, low achievers attributed failure more to ability than did high achievers. Fitch (1970) observed that individuals with high self-esteem attributed failure less to internal causes than did individuals with low self-esteem. Adler (1980) observed that working business students with high self-esteem made more internal attributions for satisfying work experiences than did students with low self-esteem. In the present research, both direct and interactive associations between perceived performance, individual difference variables, and causal attributions were explored.

Finally, analyses were conducted to examine the relationships between perceived performance, performance attributions, and task affect and expectancies. Weiner (1979, 1980) argued that internal attributions for success are associated with positive affect and internal attributions for failure with negative affect. In addition, stable attributions are associated with expectations of similar performance in the future and unstable attributions with expectancy shifts.

Study 1

Full time nurses were asked at the end of a working day to explain their job performance by using eight causal categories and to rate their performance

satisfaction as well as their expectations for future performance. A measure of self-esteem was included in the questionnaire.

Method

Respondent Sample and Organization. Surveyed were 81 registered nurses working in all major subunits of a 283-bed hospital. Questionnaires were administered to small groups at the end of a shift. Participation was voluntary, although encouraged by the hospital administration. All respondents were female. Ages ranged from 21 to 61 years ($\bar{X} = 33.72$, s.d. = 10.71). Job tenure ranged from 1 to 387 months ($\bar{X} = 46.48$, s.d. = 56.21).

Selecting Causal Categories. Eight variables were generated by modifying the eight specified by Weiner (1979): job skill, mood, usual work pace (stable effort), extra burst or drop in effort (unstable effort), boss, co-workers, mood, good or bad luck, and job difficulty. Interviewed in pretests were 10 nursing supervisors, who were asked to list determinants of nurse performance. Of a total of 26 causes mentioned, 13 were mentioned only once. Of the other 13 suggested, all but 2 were represented by the above 8 categories. These were "liking for the job" and "personal life." These latter two variables were included in a final set of 10 causes.

Questionnaire. Respondents completed a demographic section followed by Rosenberg's (1965) self-esteem inventory consisting of a set of 10 statements (e.g., "On the whole, I am satisfied with myself."), each followed by a 4-point scale with the category labels "strongly disagree," "disagree," "agree," and "strongly agree." The 10 items were summed to obtain a measure of self-esteem. Respondents then rated their performance ("In your opinion, how well did you perform your job today?") on a 5-point scale from "very poorly" to "very well." They also rated how satisfied they were with their performance ("How do you feel about your overall job performance today?") by using a 7-point scale (1 = "I am extremely dissatisfied with it," 7 = "I am extremely satisfied with it"). They then rated how much each of the 10 causal variables contributed to their work performance on a 7-point scale (1 = "no effect," 7 = "extremely large effect"). Finally, they revealed their job expectations for the next day by checking one of three possible response categories: "I believe my overall job performance will go down," "I believe my overall job performance will continue at its present level," "I believe my overall job performance will improve."

Results and Discussion

Perceived Influence of Causal Variables. The mean and standard deviation of the ratings for each causal variable were computed together with the number of nurses who rated the variable as having had no causal effect: job skill ($\bar{x} = 4.82$, s.d. = 1.44, number of "no effect" ratings = 3); mood (4.10, 1.66, 11); usual work pace (4.20, 1.49, 7); co-workers (4.27, 1.48, 6);

boss (3.36, 1.77, 17); job difficulty (4.12, 1.69, 10); luck (1.98, 1.43, 47); unusual work effort (2.95, 1.66, 21); liking for job (3.96, 1.83, 13); and personal life (2.54, 1.77, 36). Of the nurses responding, 31 (38.8 percent) used all 8 categories derived from Weiner's (1979) causal scheme; 74 (91.4 percent) used at least 4 of the 8 variables. The cause with the fewest no effect ratings and highest mean value was ability; the cause with the most no effect ratings and lowest mean value was luck. Both personal life and liking for the job were used by 43 nurses (53.1 percent) in their causal attributions; another 27 (33.3 percent) used at least 1 of the 2. Only 11 nurses (13.6 percent) refrained from using either.

The ratings of causal importance for all the variables were highly intercorrelated. Similar intercorrelations have been found in previous research and are intuitively reasonable. One would expect, for example, that attributions to luck would have implications for attributions to ability. However, all the intercorrelations were positive in the present study. Such data suggest that organizational actors might have a tendency to use or not use several variables in performance explanations. Because job experience might lead to task routinization and a diminished tendency to explain performance in causal terms, older and more experienced nurses might have used fewer causal categories. Correlations were computed between job tenure, age, and the number of causal variables that were given ratings of two or greater by the respondent. This was done for Weiner's eight variables and the two additional variables separately. None was significant.

Causal Attributions and Perceived Job Performance. Correlations were computed between percieved performance ratings and causal attributions (see Table 1). The mean performance rating was 3.92 (s.d. = .74). To determine whether perceived performance was associated with causal internality, an "internality score" was computed by subtracting the sum of all external attributions (i.e., luck, boss, co-worker, and job difficulty) from the sum of all internal attributions (i.e., job skill, usual work pace, unusual effort, and mood), using only the eight variables derived from Weiner (1979). The internality score was introduced by Weiner et al. (1971) and is considered by most attribution researchers to be a valid indicator of general causal internality. The correlation between the internality score and perceived performance was not significant. However, perceived performance was positively related to ratings for three causal variables: job skill, usual work pace, and co-workers. The greater attribution of good performance to co-workers is not in line with the internalization hypothesis. One explanation is that subunit pride existed within nursing units such that co-workers strongly identified with each other. An alternative nonmotivational explanation for co-worker attributions is the possibility that job success at such a complex job depends upon cooperative action.

Self-Esteem, Causal Attributions, and Perceived Job Performance. The mean self-esteem score was 31.96 (s.d. = 3.69). The coefficient alpha was .82. Of 10 correlations between self-esteem and causal attributions, 4 were significant: between self-esteem and co-worker ($r = -.26$, $p \leq .05$); job

Table 1
Intercorrelations Between Attributions, Perceived Performance, Affect, and Expectancies, Study 1 ($N = 81$)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Perceived performance	—	.33*	.16	.30*	.28*	.02	.13	.01	.03	.15	.02	.72*	−.13	.14	.11	.29*
2. Job skill		—	.35*	.37*	.37*	.19	.23*	.06	.12	.24*	.00	.36*	−.10	.38*	.33*	.10
3. Mood			—	.55*	.41*	.31*	.42*	.31*	.53*	.44*	.32*	.05	.05	.41*	−.25*	.02
4. Usual work pace				—	.46*	.30*	.56*	.22*	.35*	.45*	.03	.06	.10	.28*	.25*	.10
5. Co-workers					—	.35*	.31*	.33*	.23*	.36*	.25*	.11	−.19	−.22*	−.16	−.26*
6. Boss						—	.24*	.20	.27*	.24*	.18	−.06	−.03	−.34*	.28*	−.06
7. Job difficulty							—	.36*	.33*	.30*	.13	−.01	−.04	−.18	.27*	−.24*
8. Luck								—	.53*	.25*	.14	.02	.03	−.28*	−.49*	−.22*
9. Unusual work effort									—	.40*	.21*	−.12	−.01	.29*	−.48*	.01
10. Liking for job										—	.23*	.09	−.05	.15	−.09	−.10
11. Personal life											—	−.05	.10	−.05	−.22*	−.28*
12. Satisfaction												—	−.20	.11	.10	.25*
13. Expectations													—	−.05	.02	.03
14. Internality score														—	−.10	.41*
15. Stability score															—	.11
16. Self-esteem																—

*$p < .05$

difficulty ($r = -.24$, $p \leq .04$); luck ($r = .22$, $p \leq .05$); and personal life ($r = .28$, $p \leq .01$). Moderated regressions were conducted in which the performance rating, self-esteem score, and the performance × self-esteem interaction were used to predict each causal rating. The interaction term was significant for four causal variables: usual work pace (13.4 percent additional variance, $p \leq .001$); job difficulty (4.6 percent additional variance, $p \leq .05$); unusual effort (4.8 percent additional variance, $p \leq .05$); and co-workers (6.6 percent additional variance, $p \leq .01$). Table 2 contains the mean attributions for each of the four groups formed by median splits on the performance ratings and self-esteem scores.

Table 2
Mean Causal Attributions for Median Splits on Perceived Performance and Self-Esteem, Study 1

	Self-Esteem			
	High Perceived Performance		*Low Perceived Performance*	
	High (N=30)	*Low (N=11)*	*High (N=30)*	*Low (N=10)*
Job skill	5.03	4.54	5.10	3.70
Mood	4.33	3.81	3.97	4.10
Usual work pace[a]	4.83	3.27	3.80	4.60
Co-workers[a]	4.17	3.09	4.70	4.60
Boss	3.16	3.91	3.43	3.10
Job difficulty[a]	4.33	2.73	4.10	5.10
Luck	1.73	1.64	2.20	2.40
Unusual work effort[a]	3.03	2.64	2.77	3.60
Liking for job	3.90	3.82	4.23	3.50
Personal life	1.93	1.91	3.40	2.50

[a]Statistically significant interaction in moderated regression analyses.

Perceived Performance, Causal Attributions, Affect, and Expectancies. The average rating of satisfaction with work performance was 5.91 (s.d. = 1.23). Expectancy scores were recoded so that individuals expecting the same level of performance the following day were scored as zero, individuals not expecting the same performance (either higher or lower) were scored as one. This transformation could test the argument that certain causal perceptions are associated with expectancy shifts. The direction of the shift is irrelevant. The average expectancy score following the transformation was .37 (s.d. = .49). Correlations between causal attributions and satisfaction and expectancies are presented in Table 1.

For affect ratings, the only significant correlation was a positive correlation between job skill and satisfaction. The correlation between perceived performance and satisfaction was very high ($r = .72$, $p \leq .001$). It is possible that the skill-satisfaction relationship was a function of perceived job performance. This possibility was examined by simultaneously entering perceived performance and skill attributions into a regression equation predicting satisfaction. Both perceived performance ($\beta = 1.13$, $p \leq .001$) and job skill ($\beta = .12$, $p \leq .10$) contributed significantly to the prediction of satisfaction, although the latter only marginally so.

Moderated regression analyses were conducted for each causal variable and for the internality score such that perceived performance and causal rating were first entered into a regression equation predicting satisfaction followed by the performance × attribution interaction term. None of the 11 interactions was significant.

It was hypothesized that causal stability should be associated with future work expectations. Because the expectancy measure was transformed to reflect deviations from expected similar performance, this hypothesis would lead one to expect a negative correlation between attributional stability and work expectations. To test this argument, a "stability score" similar to that used by Weiner et al. (1971) was computed by subtracting the sum of the unstable attributions (i.e., mood, luck, unusual work effort, and co-workers) from the sum of the stable attributions (i.e., job skill, boss, usual work pace, and job difficulty). The correlation betwen the general stability score and job expectations was not significant ($r = .02$), nor was that between perceived performance and job expectations ($r = -.13$). No significant interactions between performance and causal attributions in predicting expectations were found.

Study 2

Production employees at a manufacturing plant producing automotive products were administered a questionnaire at the end of an 8-hour shift. Three modifications to the procedure used in Study 1 were introduced. First, only the eight causal categories derived from Weiner (1979) were incorporated into the final instrument. However, an open-ended question was included requesting respondents to list any additional causes that influenced their work performance that day. Second, affect was measured with greater specificity. Weiner, Russell and Lerman (1978, 1979) distinguished between affect that is dependent solely on the outcome of the task (e.g., satisfaction) and affect that is linked to the nature of causal explanations for the outcome (e.g., pride and shame). Both specific and general performance affect were measured. Finally, achievement motivation rather than self-esteem was included in the study.

Method

Respondent Sample and Organization. The manufacturing plant employed approximately 300 individuals. Respondents were selected primarily on the basis of convenience. Contacted were 75 production employees. Of these, 57 were able to attend questionnaire sessions held in small groups at the end of an 8-hour shift. Day shift employees accounted for 54 percent; the other 46 percent worked the evening shift. Approximately 17.5 percent were black, 71.9 percent were white, 5.3 percent Spanish surnamed, with the rest not providing information on race. The average age was 32.56 (s.d. = 10.83) years, with a range from 18 to 62. The average time spent

on their current job was 32.82 months (s.d. = 47.94), with a range from 1 month to 20 years. There were 52.6 percent males and 45.6 percent females. Some respondents failed to provide complete data. However, missing items were few in number and distributed across several individuals and items, and all respondents were included in the final analyses. The statistics reported below are based on *N*s ranging from 54 to 57.

Questionnaire. The questionnaire consisted of six sections. First, individuals rated their performance with two items: "In general, how do you rate the quantity of your work today?" and "In general, how do you rate the quality of your work today?" Answers were on 7-point scales with the endpoints "extremely poor" and "extremely good."

Second, respondents rated the impact of each of the eight causal variables derived from Weiner (1979) in a manner identical to that used in Study 1. Following these ratings, respondents could list other factors that had influenced the quantity and quality of their work.

Third, respondents indicated their expectations for future performance on two items: "Imagine that you will come to work tomorrow. How do you think the quantity and quality of your work tomorrow will compare to your work today?" and "Imagine that you will come to work on an average day six months from now. How do you think that the quantity and quality of your work on that day will compare to your work today?" Ratings were on 7-point scales with anchors "very much lower" to "very much higher."

Fourth, affect was measured by three questions: "In general, how pleased are you with the quantity and quality of your work today?" (1 = "I'm not pleased at all with it," 7 = "I'm extremely pleased with it"); "How proud are you of the quantity and quality of your work today?" (1 = "I'm not proud at all of it," 7 = "I'm extremely proud of it"); and "How ashamed are you of the quantity and quality of your work today?" (1 = "I'm not ashamed of it at all," 7 = "I'm extremely ashamed of it").

Fifth, respondents completed the achievement motivation subscale of Steers and Braunstein's (1976) manifest needs questionnaire. Although the psychometric properties of the MNQ are still somewhat unknown (Brief, Aldag, Darrow, & Power, 1980), it is the only short measure of achievement motivation designed for use in organizations.

Finally, respondents completed a demographic section.

Results and Discussion

Perceived Influence of Causal Variables. The mean, standard deviation, and number of respondents who had no effect ratings were computed for each variable: job skill ($\bar{x} = 4.28$, s.d. = 1.54, number of "no effect" ratings = 6); mood (3.04, 1.68, 17); usual work pace (2.91, 1.47, 15); coworkers (2.43, 1.69, 27); boss (2.61, 1.74, 24); job difficulty (3.05, 1.63, 15); luck (2.02, 1.41, 32); unusual work effort (2.32, 1.37, 25). All 8 causal variables were used by 13 respondents (22.8 percent); 40 (70.2 percent) used

at least 4. Only three (5.3 percent) employees used none of the eight causes. Job skill was used by the largest number of respondents and had the highest mean value; luck was used by the fewest number and had the lowest mean value. An analysis of the open-ended items revealed that 17 respondents (29.8 percent) provided at least one additional causal variable. Of the 17, 2 provided 2 variables. A classification of the responses resulted in 12 causal categories being noted. Only four categories had frequencies greater than one: the necessity of having to do multiple jobs ($N=2$), employee physical condition ($N=2$), quality of work material ($N=2$), and unfamiliar tasks ($N=2$).

Correlations were computed between the number of causes used and age and job tenure. A significant correlation was obtained between number of causes and age ($r=-.43$, $p<.01$) but not job tenure ($r=-.20$).

Causal Attributions and Perceived Job Performance. The mean rating for perceived job quantity was 5.05 (s.d. = 1.16). The mean perceived job quality rating was 5.60 (s.d. = .842). These two ratings were highly correlated ($r=.68$) and were collapsed into a single summed measure of perceived job performance. Correlations between the composite performance rating and each of the eight attributional ratings and internality score are indicated in Table 3. None of the correlations was significant.

Need for Achievement and Causal Attributions. Items for the Steers and Braunstein (1976) achievement subscale were scored and summed. The mean score was 23.96 (s.d. = 4.68). The coefficient alpha was .55. Achievement motivation was positively associated with job skill ($r=.31$, $p<.05$) and boss ($r=.29$, $p\leq.05$) attributions. A marginally significant positive correlation was obtained between achievement motivation and attributions to unusual work effort ($r=.22$, $p\leq.10$). Moderated regression analyses testing for interactions between achievement motivation and performance in predicting each attributional category revealed no significant interactions.

Perceived Performance, Causal Attributions, Affect, and Expectancies. The mean ratings for the affect items were 4.61 (s.d. = 1.63), 1.44 (s.d. = .98), and 4.52 (s.d. = 1.42) for pride, shame, and general satisfaction, respectively. Expectancy items were recoded to reflect deviations from a rating of no change in future performance. The mean rating for short term expectations was .71 (s.d. = .85), and for long term expectations was 1.0 (s.d. = .83).

The correlations between perceived performance, causal attributions, and affect measures are included in Table 3. Perceived performance was positively associated with pride and general satisfaction, and negatively related to shame. Attributions to job skill were positively associated with pride and general satisfaction, and negatively associated with shame. When considered simultaneously, both skill and performance had significant beta weights for all three of the affect measures. No interaction terms were significant. Boss attributions were associated with pride and general satisfaction. However, when perceived performance was controlled, the partial correlation between boss attributions and affect was nonsignificant.

Table 3
Intercorrelations Between Attributions, Perceived Performance, Affect, and Expectancies, Study 2[a]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Perceived performance	—	.05	.01	.11	−.09	.13	.07	−.16	−.01	.69*	.64*	−.45*	−.06	−.03	.10	.18	.24
2. Job skill		—	.25	.22	.19	.37*	.18	.00	.14	.27*	.26*	−.26*	.17	.10	.28*	.44*	.31*
3. Mood			—	.45*	.32*	.29*	.38*	.27*	.49*	−.15	−.10	.04	.10	.06	.35*	−.29*	.10
4. Usual work pace				—	.29*	.16	.62*	.02	.24	.01	−.06	.10	.10	.09	.29*	.31*	−.08
5. Co-workers					—	.58*	.41*	.29*	.26*	−.11	−.08	−.01	.43*	.25	−.55*	−.10	.17
6. Boss						—	.41*	−.01	.39*	.24	.22	−.04	.15	.29*	−.42*	.28*	.29*
7. Job difficulty							—	.01	.34*	.00	−.19	.12	.06	.13	−.18	.40*	−.06
8. Luck								—	.46*	−.20	−.13	−.07	.11	.09	−.24	−.63*	.13
9. Unusual work effort									—	.03	−.04	−.01	.04	.06	.10	−.35*	.22
10. General satisfaction										—	.81*	−.57*	−.17	−.06	.06	.35*	.31*
11. Pride											—	−.56*	−.19	−.09	.07	.22	.23
12. Shame												—	.22	.04	−.03	−.03	−.14
13. Short term expectations													—	.58*	−.16	−.08	.21
14. Long term expectations														—	−.29*	−.04	.16
15. Internality score															—	.01	−.01
16. Stability score																—	−.04
17. Achievement motivation																	—

[a] *N*s range from 54 to 57.
*$p < .05$

Neither short term nor long term expectations were associated with perceived performance. Expectations also were not related to general stability of attributions. Long term expectations were positively associated with both boss ($r = .29, p \leq .05$) and co-worker ($r = .43, p \leq .01$) attributions. Each of these relationships remained statistically significant when perceived performance was controlled.

General Discussion

The present results provide only partial support for previous attributional theorizing as it applies to organizations. Although the set of variables derived from previous research was fairly comprehensive, the relationships observed within laboratory experiments were not found in the present studies. Generalized ego-protective and ego-enhancement biases were not observed, and the relationships between the internality of attributions and affect and between the stability of attributions and expectations were largely nonsignificant. Moreover, perceived performance was associated with affect (both general and specific) independent of causal beliefs. Given that all such constructs were measured by the same questionnaire at the same time, the lack of strong relationships is noteworthy. Common method variance should have served to inflate correlational values.

A number of limitations to the present study might have diluted the relationships typically observed in laboratory experiments on attributions. Many of the constructs were measured with single items constructed for the present study only. The reliability and validity of such items thus are open for question. Attributions were focused on perceived success or failure rather than objective job performance. The questionnaire was administered only once, and it is possible that employee attributions fluctuate from day to day and develop over a longer time span into a more general attributional perspective on work successes and failures across many work episodes. All of these factors must serve to temper the conclusions of the study.

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Shift Work Schedules and Their Relationship to Health, Adaptation, Satisfaction, and Turnover Intention

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Relationships among shift work related problems, general physical and psychological health, and job shift satisfaction and preference were examined for 732 plant operators working on a 28-day rotating shift schedule. The obtained low to moderate correlations were explained in terms of variability in adaptation and adjustment to shift schedules, aging, and community facilitation.

The use of shift work schedules for approximately 25 percent of the labor force in North America (Tasto & Colligan, 1977) has resulted in numerous, diverse studies of its concomitant problems. Recent reviews (Agervold, 1976; Dunham, 1977) have documented a number of problems that occur with greater frequency for shift workers than for those on regular day schedules. Physical problems have included sleep disruption, appetite and digestive disturbances, elimination problems, upper gastrointestinal disorders, poor general medical health, and disrupted rhythmic functioning. The psychological effects of shift work are reflected in patterns of social and solitary activity, relationships with one's family and spouse, general psychological health, and job satisfaction. Finally, sociological analyses of problems related to shift work have highlighted the importance of the worker's surrounding social community (Dunham, 1977).

Four areas of shift work that have received relatively little attention are (1) satisfaction with an existing schedule, (2) preference for changes in the existing schedule, (3) adaptation and adjustment to the shift, and (4) intentions to stay with or leave an organization. With regard to satisfaction, Dunham (1977) concluded that there is an inherent factor in shift work

causing shift workers to be less satisfied with their jobs than day workers. This conclusion, however, is equivocal. Studies have shown that more workers are satisfied than dissatisfied with their shift work schedules (Blakelock, 1960; Spencer, 1970; Wedderburn, 1967). In addition, some studies found increased satisfaction when workers worked their preferred shift schedule (De La Mare & Shimmin, 1964; Walker, 1966). Few of the studies, however, have related satisfaction with the shift to perceptions of the shift-related problems mentioned above. An exception is a study by Mott, Mann, McLoughlin, and Warwick (1965), who compared fixed and rotating shift workers and found that those who wanted to change from a fixed afternoon to a fixed day shift wanted to do so because of the afternoon shift's interference with their paternal role. Mott et al. also reported that more people working a rotating shift wanted to change schedules than did those working a fixed shift. One purpose of the present study is to explore further the relationships between satisfaction with a particular rotating shift schedule, preference for such a schedule, and several shift-related problems of a personal, organizational, job, and family nature.

A second relatively neglected aspect of shift work is that of psychological adaptation and adjustment to the shift. The several studies that have found no relationship between shift work and health problems have been explained in terms of adaptation (Aanonsen, 1964; Koller, Kundi, & Cervinka, 1978). That is, because only those still working on shifts at the time of study were available for analysis, it is presumed that they adapted, whereas those who were no longer with the organization were not able to adapt.

Longitudinal studies that have compared those who remained in shift work with those who left have found that health deteriorates over time because workers fail to adapt successfully (Meers, Maasen, & Verhaegen, 1978). However, none of these studies had directly examined adaptation within a shift or between shifts. Such examinations constitute another purpose of the present study.

If shift work has negative consequences for a worker, then one might expect a greater desire to leave the organization or to switch jobs. If, however, the nature of the work for which the employee is qualified can be conducted only via shift schedules, then switching is not a viable option. This study explores the relationships between intentions to stay in an organization and perceptions of the organization, of the job, and of the personal consequences of shift work.

In sum, the specific purposes of this study are to examine the relationships of (1) global variables of general health, satisfaction with shift schedule, preference to keep or change the shift schedule, and turnover intention with reports of specific health problems, job satisfaction, satisfaction with social and personal life factors, and organizational characteristics, and of (2) psychological and perceived adaptation with shift, personal, and organizational characteristics.

Method

Research Setting and Subjects

The study was conducted in a power and gas utility located in the western United States. The particular employees studied were the plant operators in gas, steam, electric, and hydro power substation plants who worked on shift schedules. Approximately 1,130 shift work employees worked in the job classification of plant operator across 66 plants.

Employees worked on a 28-day rotating shift schedule. The "day" shift was from 7 AM to 3 PM; the "swing" shift was from 3 PM to 11 PM; and the "graveyard" shift was from 11 PM to 7AM. The shift schedule was as follows: 6 "days" on, 2 days off; 7 "swings" on, 4 days off; and 7 "graveyards" on, 2 days off.

Questionnaires ($n = 1,130$) were distributed by plant supervisors. Employees returned the anonymous questionnaires directly to the researchers in a stamped, self-addressed envelope. Usable questionnaires were obtained from 732 employees. Given that it was unlikely that all 1,130 questionnaires were distributed, the response rate is considered to be at least 65 percent. Percentage comparisons of the sample and population on demographic characteristics (e.g., sex, age, and tenure in the job) as well as type of plant in which one operated revealed that the sample reflected the population statistics and that no one group was under- or overrepresented.

The respondents were predominantly male (96 percent), white (84 percent), married (79 percent), and between the ages of 25 and 34 (43 percent). Of the respondents, 41 percent had been with the company between 4 and 14 years; 59 percent had been on a rotating shift schedule for 1 to 14 years; 15 percent had been in rotating shifts for less than one year; and 26 percent had been on such shifts for more than 14 years.

Questionnaire

The researchers conducted individual and group interviews at 12 plants, which resulted in the identification of the following areas for survey by a questionnaire: (1) background information, (2) health information, (3) satisfaction, (4) perceptions of the work environment, (5) general psychological well-being, and (6) shift preferences.

(1) *Background Information.* This section contained 24 questions dealing with age, race, sex, marital status, family size, residence issues, and other demographics. Data on responses to several of these questions are reported above.

(2) *Health Information.* This section contained 49 questions dealing with health, sick leave, use of medications, biological functions, appetite, medical symptoms, and sleep habits. Principal components analyses were performed on subsections of the questions for purposes of developing subscales to be used in analyzing the data. Varimax rotations and orthogonal solutions were sought. Items with loadings of .40 or greater on factors with eigenvalues

of 1 or more were retained for the factors. These analyses resulted in the following specific health indices: (1) digestion problems (eight items, coefficient alpha = .86), (2) muscle pains (six items, coefficient alpha = .79), and (3) heart problems (four items, coefficient alpha = .79). General health was measured by a 1-item question, "In general, how would you describe your health?" Response categories ranged from 1 (excellent) to 4 (poor).

(3) *Satisfaction.* This section contained 33 questions covering (a) job satisfaction, (b) shift satisfaction, (c) shift hours satisfaction, (d) satisfaction with time for social and leisure activities, family, and children, and (e) intention to stay with the organization. Job satisfaction was assessed by the standardized Minnesota Satisfaction Questionnaire (MSQ) (Weiss, Dawis, England, & Lofquist, 1967). The MSQ measures intrinsic (coefficient alpha = .84), extrinsic (coefficient alpha = .77), and overall (coefficient alpha = .88) job satisfaction. Principal components analyses of subsections of the remaining items in this section yielded the following scales: (1) satisfaction with time for solitary activities (solitary, 5 items, coefficient alpha = .83); (2) satisfaction with time for social activities (social, 3 items, coefficient alpha = .85); (3) satisfaction with time for family activities and responsibilities (family, 7 items, coefficient alpha = .91); and (4) satisfaction with time for attention to children (children, 3 items, coefficient alpha = .92). In addition, there were individual items relating to satisfaction with shift schedules, shift hours, and shift characteristics. Higher scores on these scales and items indicate greater satisfaction.

(4) *Perceptions of Work Environment.* The 60-item perceived work environment questionnaire (PWE) (Newman, 1977) was used to measure perceptions of the work environment. The 11 scales (and their coefficient alphas) included in the PWE are (1) supervisory style = .92; (2) task characteristics = .82; (3) performance-reward relationships = .60; (4) co-worker relations = .85; (5) employee work motivation = .80; (6) equipment and arrangement of people and equipment = .74; (7) employee competence = .80; (8) decision making policy = .71; (9) work space = .61; (10) pressure to produce = .52; and (11) job responsibility = .59. Questions were answered on a 5-point scale in which higher values indicated that the content of the item was most descriptive of the work environment.

(5) *Current Psychological Well-Being.* This section contained 51 adjectives. Respondents indicated the degree to which each adjective described how they felt at the time they were completing the questionnaire, on the particular day within their particular shift. Principal components analysis yielded four factors; (1) enthusiasm—14 items such as friendly, active, energetic; coefficient alpha = .92; (2) tension—4 items such as tense and shaky; coefficient alpha = .75; (3) tiredness—4 items such as worn out and exhausted; coefficient alpha = .92; and (4) irascibility—20 items such as angry, touchy, bitter, and rebellious; coefficient alpha = .95. All responses were coded such that higher scores indicate less favorable feelings (i.e., less enthusiasm, greater irascibility, more tension, and more tiredness).

These "well-being" scales were used to study part of the adaptation hypothesis. Respondents also indicated, on 5-point scales, how long it took

them to adjust to new meal times and sleep schedules after changing shifts. Responses ranged from 1 (I adjust right away) to 5 (I never adjust). A background question, whether the respondent lived in a community where recreational and leisure facilities were available that fit one's schedule (yes = 1 and no = 2), also was used in the adaptation analysis.

(6) *Shift Preferences.* Respondents were asked to rank order their preferences for 11 shifts. One of the alternatives was to "leave shift schedules as currently assigned." The other 10 alternatives were variations on the number of hours per shift, number of days in each shift, and frequency of alternating shifts. For analytical purposes, responses were dichotomized into those who most preferred no change (coded as 0) and those who most preferred 1 of the remaining 10 alternatives (coded 1).

Data Analysis

The primary dependent variables were (1) self-description of general health, a 4-point scale ranging from 1 (excellent) to 4 (poor); (2) satisfaction wth current rotating shift, a 5-point scale ranging from 1 (very dissatisfied) to 5 (very satisfied); (3) preference for retaining or changing shift schedule; and (4) intention to stay with the organization, a 5-point scale ranging from 1 (certainly) to 5 (certainly not). These variables were correlated with independent variables, subscale scores, and individual questions pertaining to shift work related problems. ("Dependent" and "independent" are used for descriptive purposes and do not imply causal relationships.) Regression analyses were used to establish the amount of dependent variable variance explained by sets of variables. Finally, analyses of variance were conducted to determine whether perceptions, feelings, and satisfaction vary as a function of the particular shift and day within shift that the respondent was on when completing the questionnaire.

The 23-page questionnaire used in this study included approximately 300 questions. Many of the variables described above are multi-item indices derived through factor analyses. However, a number of variables were measured by single-item responses. Use of single-item, self-report dependent variables presents potential problems of reliability, validity, and method variance. To study such problems, correlations between one-item variables and objective indices should be examined. This was not possible in the current organization because employee records were incomplete and responses were anonymous. Consequently, those single-item measures that were used in analyses were chosen mainly because of their correlation with scale scores that represented similar constructs and therefore demonstrated convergent validity. In addition, some single-item measures (e.g., number of sick days taken or indication of having been treated for specified illnesses) were used (1) because they were of the type that suggested to the respondent that answers could be verified, and (2) the responses to them reflected a description of one's activity and not an attitude or evaluation. Such self-report single-items are less prone to problems of reliability, validity, and method variance.

Results

Dependent Variables/Shift Work

Table 1 shows the correlations between the dependent variables (general health, satisfaction with current shift, preference for a change in the shift schedule, and turnover intention) and some of the independent variables

Table 1
Correlations between Dependent Variables and Shift Work Related Factors

	General Health		*Satisfaction with Shift*		*Preference for Shift Change*		*Turnover Intention*	
Variable	*r*	*R*	*r*	*R*	*r*	*R*	*r*	*R*
Health								
Digestion problems	.40**		-.24**		.16**		.21**	
Muscle pains	.37**		-.13**		NS		.19**	
Heart problems	.45**		-.18**		.13**		.20**	
		.49**		.26**		.20**		.22**
Satisfaction								
MSQ (intrinsic)	-.17**		.37**		-.23**		-.37**	
MSQ (extrinsic)	-.19**		.36**		-.15**		-.33**	
MSQ (overall)	-.21**		.42**		-.23**		-.40**	
		.21**		.42**		.24**		.40**
Solitary activities	-.22**		.34**		-.20**		-.24**	
Social activities	-.17**		.44**		-.26**		-.21**	
Family activities	-.20**		.50**		-.32**		-.31**	
Activities with children[a]	-.21**		.44**		-.23**		-.19**	
		.25**		.54**		.36**		.27**
Perceived work environment								
Supervisory style	-.16**		.31**		-.12**		-.21**	
Task characteristics	-.17**		.31**		-.14**		-.23**	
Performance-reward	-.15**		.19**		NS		-.17**	
Co-worker relations	-.24**		.31**		-.12**		-.25**	
Employee work motivation	-.18**		.32**		-.14**		-.21**	
Equipment/space	-.15**		.28**		-.10**		-.20**	
Employee competence	-.16**		.27**		-.08*		-.20**	
Decision making	-.09**		.29**		-.15**		-.23**	
Work space	-.13**		.08*		NS		-.08*	
Pressure	NS		.07*		NS		NS	
Responsibility	-.11**		.23**		-.10**		-.14**	
		.31**		.41**		.19**		.35**
Current feelings								
Enthusiasm	.30**		-.35**		.17**		.25**	
Tension	.25**		-.23**		.14**		.16**	
Tiredness	.24**		-.32**		.16**		.20**	
Irascibility	.24**		-.32**		.16**		.29**	
		.36**		.42**		.20**		.34**
Total Equation[a]		.62**		.66**		.48**		.54**

NS = Not significant.

[a]The variable reflecting satisfaction with involvement with one's children was deleted from the equation when *R* was calculated because many respondents had no children.

*$p < .05$

**$p < .01$

(self-reported health, job satisfaction, satisfaction with personal life, perceptions of the work environment, and current feelings. As seen in the table, the correlations, though significant, are low to moderate.

Analysis of the shift preference dependent variable showed that "leave the shift as currently assigned" was the one most preferred alternative (32 percent), whereas the remaining 68 percent distributed themselves among the other 10 alternatives. For the dependent variable of "intention to stay with the organization," 45 percent indicated "certainly," 28 percent indicated "probably," and the remaining 27 percent were uncertain or probably would not stay.

Table 1 also shows the multiple correlations obtained when each dependent variable is regressed on each subset of independent variables. In general, the multiple correlations for the subsets are somewhat larger than the individual zero-order correlations for variables within a subset, indicating redundancy among the variables within the subsets. These *R*s for the total set of independent variables ($k = 24$), however, need to be interpreted cautiously because the subject-to-variable ratio is approximately 30 to 1, a figure less than the 40 to 1 ratio suggested by Cohen and Cohen (1975).

Correlations between satisfaction with current schedule variable and satisfaction with the day, swing, and graveyard hours were .30, .54, and .65, respectively (all p's $< .01$). Those who were more satisfied with the current schedule also had taken fewer sick days ($r = -.10$, $p < .01$); number of sick days was not correlated with preference for change in the shift schedule. In a similar vein, those who reported themselves in better health reported fewer sick days taken in the past year ($r = .16$, $p < .01$). Furthermore, those who were more satisfied with the current schedule reported less trouble sleeping ($r = -.28$, $p < .01$); less use of medications such as aspirins ($r = -.13$, $p < .01$); less use of aids for digestion problems ($r = -.13$, $p < .01$); and less use of tranquilizers ($r = -.08$, $p < .05$). Those who preferred the current schedule also reported less trouble sleeping ($r = .16$, $p < .01$), but there was no relationship between preference for the current shift and use of medications.

Adaptation

Adaptation to shift work was studied by examining the relationships among variables that reflect a developmental process (age, tenure, and time in rotating shift) and the dependent variables of satisfaction, adjustment, and health. These results, summarized in Table 2, suggest that the older, more experienced worker was more satisfied and had less preference for change.

Results also indicate that when changing shifts, the adjustment to new meal times is fastest for the older worker, for the worker with the longest tenure with the organization, and for the worker with the longest tenure in rotating shift schedules. Also, when changing shifts, adjustment to new sleep times is fastest for the older worker, for the worker with the longest

Table 2
Correlations between "Developmental Process" Variables and Specific Dependent Variables

	Age	*Tenure*	*Time in Rotating Shift*
Satisfaction with shift	.28**	.22**	.20**
Preference for shift change	-.26**	-.23**	-.21**
Adjustment to new meal times	-.11**	-.06*	-.07*
Adjustment to new sleep times	-.11**	-.06*	-.09**
General health	.18**	.23**	.22**
Digestion problems	.10**	.16**	.15**
Muscle pains	.21**	.27**	.23**
Heart problems	.09**	.17**	.15**

*$p < .05$
**$p < .01$

tenure with the organization, and with the longest tenure in rotating shifts. These data suggest that the older, experienced worker adjusts more readily.

The above results are consistent with the findings for satisfaction with the shift and shift preferences; those who are satisfied adjust quickly to new meal times ($r = -.43, p < .01$) and to new sleep times ($r = -.39, p < .01$), and those who prefer no change adjust quickly to meal times ($r = .21, p < .01$) and to new sleep times ($r = .43, p < .01$). Turnover intention also correlated with adjustment to meal times ($r = .27$, $p < .01$) and to sleep schedules ($r = .22, p < .01$); those who adjusted more slowly expressed a higher probability of leaving the organization.

An examination of the correlations between age and tenure variables and perceptions of general health (see Table 2) show a different pattern. Those who are older and those with more experience in shift rotation schedules perceive themselves to be in poorer health. Yet those who are in better health report better adjustment to meals ($r = .21$, $p < .01$) and to sleep ($r = .21$, $p < .01$).

The correlations between the medical factors of digestion problems, muscle pain, and heart problems and the variables of age, tenure with the organization, and tenure in rotating shifts (see Table 2) again suggest that the older, more experienced worker has greater health problems. Yet the results cited above suggest that the older and more experienced workers are more satisfied and less willing to change schedules.

Another factor examined pertaining to adjustment was community facilitation. Workers who reported that they lived in a community where recreational and leisure facilities were available that fit their work schedules were more satisfied with the current schedule ($r = -.16, p < .01$) and preferred no change in the shift schedule ($r = .11$, $p < .01$).

The question of adaptation also was studied by examining differences between workers as a function of type of shift and specific time within shift. Because the current study used a cross-sectional design, the gradual adaptation of workers through their 28-day shift cycle could not be followed. Therefore, the responses of workers at different time periods and on

different shifts (day, swing, or graveyard) within each type of shift were compared to each other in order to gain additional insight into the adaptation process. A 3 shifts (day, swing, and graveyard) × 3 days within shift (day 1, days 2-4, and days 4-7) analysis of variance was performed for each of four subscales that assessed current psychological well-being at the time of completion of the questionnaire.

For irascibility, there was a significant main effect of particular shift ($F = 12.44$, $d.f. = 2, 622$, $p < .01$, $\omega^2 = .04$). In general, irascibility was greatest on graveyard and lowest on day shifts. Also, holding type of shift constant, irascibility was greatest later in the shift period. For enthusiasm, there was a significant main effect for particular shift ($F = 26.89$, $d.f. = 2, 622$, $p < .01$, $\omega^2 = .08$). Relatively low enthusiasm was reported on the graveyard shift, and relatively high enthusiasm was found on the day shift.

For tension, there was a significant main effect for day in shift ($F = 4.20$, $d.f. = 2, 622$, $p < .05$, $\omega^2 = .01$) and a marginally significant main effect for particular shift ($F = 2.71$, $d.f. = 2, 622$, $p < .07$, $\omega^2 = .01$). In general, workers were most tense later in the shift and most tense on the graveyard shift; they were least tense on the day shift. For tiredness, there were significant main effects for day in shift and type of shift ($F = 8.17$, $d.f. = 2, 622$, $p < .01$, $\omega^2 = .02$ and $F = 58.28$, $d.f. = 2, 622$, $p < .01$, $\omega^2 = .15$, respectively). Again, there were more reports of tired feelings on the graveyard shift than on the swing or the day shift; the day and swing shifts were equivalent in reports of tiredness. For day in shift, reports of tiredness increased as one was further along in the shift. This last analysis also resulted in an interaction ($F = 2.55$, $d.f. = 4, 622$, $p < .05$, $\omega^2 = .01$). In general, reports of tired feelings were highest for those late in the graveyard shift.

Discussion

Dependent Variables

An examination of Table 1 shows that the correlations between the measure of general health and the specific health variables (digestion, muscle, and pain) are greater than the correlations between general health and the other independent variables. Also, the correlations between satisfaction with current schedule and the other satisfaction variables (MSQ and personal life) generally are greater than are the correlations between satisfaction with schedule and the remaining independent variables. These patterns of correlations provide partial evidence for the construct validity of the single-item dependent variables of general health and satisfaction with current schedule. As pointed out by Campbell and Fiske (1959), the construct validity of a measure is established when it correlates more highly with measures of the same construct than with measures of different constructs.

Dependent Variables/Shift Work

As shown in Table 1, in general those who reported themselves in better general health also indicated having fewer digestion and heart problems,

less muscle pain, higher job satisfaction (intrinsic, extrinsic, and overall), greater satisfaction with their personal lives and their jobs, a perception of a better work environment, and they felt more enthusiastic and less tense, tired, and irascible. Those who were most satisfied with the current shift schedule also reported fewer digestion problems, less muscle pain, and fewer heart problems; they were more satisfied with their jobs (intrinsic, extrinsic, and overall), and they were more satisfied with time for solitary, social, family and child-related activities; they had a more positive view of the organization, and felt more enthusiastic, less tense, less tired, and less irascible.

The correlations between preference for change of shift and the independent variables indicate that those who had a greater preference for change tended to have more health problems, were less satisfied with their job and personal life, had slightly more negative perceptions of the work environment, and were less enthusiastic, more tense, more tired, and more irascible. The pattern of correlations for the variable of turnover intention is similar to the pattern for the preference variable, although the correlations are higher (yet still low to moderate) for turnover intention.

In the past, researchers have focused on comparisons between those who work shifts and those who work standard schedules. The conclusion from these studies is that shift work is inherently negative. The current findings suggest that workers vary in their reactions to shift work and that these variations are related in systematic ways to general job satisfaction, to satisfaction with the effects of their job on personal life, and to their perceptions of the work environment. For example, the current data indicate that not all shift workers experience health-related problems. Those who are free of such problems (e.g., digestive disorders) are more satisfied with the shift and less likely to terminate. Similarly, for some workers, shift work does not interfere with family or social activities, and consequently there is no dissatisfaction with shift work.

One interpretation of these findings is that some workers have adapted and have not allowed the shift to lead to medical problems or family disturbances. Those who preferred the current schedule and those who intended to stay with the organization had fewer medical problems, were more satisfied with their job, were more satisfied with time for solitary, social, and family activities, had a more positive view of the organization's environment, and reported more positive feelings. Perhaps these people have adjusted to shift work and have adjusted their lives to be congruent with shift schedules.

Adaptation

Determinants of Adaptation. One interpretation of the obtained relationship between shift work schedules and personal, family, and job problems is that workers perceive that their work schedules influence their lives. For those who are able to adjust or adapt psychologically, the current

schedules are perceived as satisfying. Those who are unable to adapt are dissatisfied and intend to quit the organization.

Some insight into adaptation is provided by the test of Dunham's (1977) notion that shift work schedule problems are created by the workers' noncongruent role in society in relationship to the time schedule of the majority of the community. The results of the present study support Dunham's notion and suggest that one mechanism for facilitating adjustment to shift work is to provide opportunities for recreational activities within the community that are flexible and that meet the needs of the community's members.

Some research has indicated that problems caused by shift work become more accentuated over time (Meers et al., 1978). The present data suggest, however, that the older, more experienced worker is more satisfied and has less preference for change, perhaps because the older worker has adapted to the schedule and its demands. Additional insight into this adaptation hypothesis also was studied by examining age, tenure with the organization, and tenure in rotating shift work as correlates of several adjustment questions. These data suggest that the older, experienced worker adjusts more readily.

An examination of the correlations between age and tenure variables and perceptions of general health showed a different pattern. Those who are older and those with more experience in shift rotation schedules perceived themselves to be in poorer health. Yet those who were in better health reported better adjustment to meals and to sleep. Thus, though the older workers have adjusted to some aspects of shift work, they perceive themselves to be in poorer health. One interpretation of these patterns of results is that the finding of decreasing general health is not attributable to shift work but rather is a function of the aging process.

Some confirmation of the above hypothesis is found in the correlations between the demographic variables and the specific health factors. These results again suggest that the older, more experienced worker has greater health problems. Yet the results cited previously suggest that the older and more experienced workers are more satisfied and less willing to change schedules.

The general findings at this point are that the older employee is more satisfied with the shift and makes better adjustment to meals; and those who are more satisfied are in better health, yet the older workers are in poorer health. (The pattern is similar for adjustment to sleep schedules.) This somewhat anomalous pattern can occur due to the relatively low zero order correlations. However, the partial correlation between general health and satisfaction with current schedule when the variable of age is held constant clarifies the results. The partial correlation is .22, as compared to the zero order correlation of .15. Thus, within age groups, there is a stronger positive correlation between health and satisfaction.

Consequences of Poor Adaptation. A variable indicative of poor adaptation or preference for change is that of turnover intention. As shown in

Table 1, intention to stay with, or leave, the organization was related to perceptions of the organization as well as perceptions of one's personal feelings. These results are consistent with a model of turnover proposed by Mobley, Griffeth, Hand, and Meglino (1979).

A variable omitted from the Mobley et al. (1979) model of the turnover process is that of adaptation. It is likely that those who adapt to the work environment and work schedules will be more satisfied and therefore express a greater probability of staying with their organization. Data collected in this study provide some support for this hypothesis.

The analyses pertaining to irascibility, enthusiasm, and tension indicate poorer psychological well-being as one progresses through the shift, as well as poorer well-being for those shifts that are not traditional—i.e., swing and graveyard. (The results are not due to age, because age distributions were equivalent across type of shift and day within shift; also, self-reported general health was similar for these groups.) These employees did not adjust well within their shifts. Additional analyses support this conclusion. It was reported by 52 percent that it took a day or less to adjust to new meal times, but 16 percent reported that they never adjust. Also, appetites were reported to be fair when on the graveyard shift, whereas they were good for day or swing shift. Furthermore, 42 percent needed 2 to 4 days to adjust to new sleep times; it took about 19, 29, and 31 minutes to get to sleep after day, swing, and graveyard shifts, respectively.

Conclusion

This study indicates that personal, organizational, job, and family problems are related to affective responses such as satisfaction with one's shift schedule. Because of the nature of the study, causal statements are precluded. Thus, some questions cannot be answered: for example, whether perceptions of a poor performance-reward relationship influence satisfaction with one's shift or whether satisfaction with one's shift influences perceptions of performance-reward relationships.

In general, the correlations found, though significant, were low to moderate in strength, leaving much variance unexplained by the variables studied. Nevertheless, because a large sample of respondents was used, these correlations are likely to be reliable indicators of true relationships among the variables.

The present study suggests that some problems that have been attributed to shift work may be, in part, a function of the aging process. In general, those who have the greatest problems, such as digestion problems, muscle pain, and heart problems or poor psychological well-being, are those who also are older and have been in shift work longer. Yet these same, older, experienced workers were more satisfied with the shift schedule and had less preference for change. Overall, the results suggest that, in the long run, workers physically adapt to and/or psychologically accept shift work schedules. An alternative explanation is that only older workers who had

successfully adapted were available for study; older workers who had severe problems or extreme difficulty in adapting had left the organization. In contrast, when viewing adjustment on a short term basis--i.e., adjustment within a particular day in the shift or comparison between shifts—the results indicated that psychological well-being deteriorates as one gets closer to the end of the shift period (or closer to days off) and that well-being is poorest in the graveyard shift. A variable of interest for future research on long or short term adjustment is that of work values (Wollack, Goodale, Wijting, & Smith, 1971). Adjustment to shift work may be a function of the degree to which workers possess traditional work values and work ethics.

Clearly, future research should examine objective measures of health, performance, or avoidance behavior such as absenteeism, tardiness, and turnover records. Unfortunately, such data were not available for the organization studied. Some of the data reported from the present study, however, were relatively objective descriptions (such as questions relating to community characteristics and demographic data). Relationships with the more objective data were consistent with those suggested by literature reviews and theory. For example, Dunham's (1977) hypothesis regarding community facilities and shift-work problems was supported. The results of the turnover intention analyses also were consistent with those found in the literature in which actual turnover data were used. Moreover, as reported by Mobley et al. (1979), behavioral intention of turnover is correlated with actual turnover. Finally, the analyses of the effects on adjustment of shift and day within shift were not influenced by self-reported method bias. Thus, this study increases the knowledge of shift work related problems and suggests new directions for future research.

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Strategic Power Relationships in Contemporary Profit and Nonprofit Hospitals[1]

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A comparative analysis of the intraorganizational power distributions of strategic decision makers in profit and nonprofit institutions was conducted to assess the effect of the institution's economic orientation. Hypotheses are tested, and the usefulness of an organization's economic orientation as a major strategic contingency variable is discussed.

The importance of strategic management to the long run survival of organizations in today's increasingly turbulent environment is well documented (Lorange, 1980; Quinn, 1980; Schendel & Hofer, 1979). One particular aspect of the strategic management process relates to the manner in which power is distributed in an organization and how this distribution affects the interpersonal relationships among those involved in making strategic decisions.

Although a number of researchers have considered different contingency variables with regard to these power-strategy distributions (with Hambrick, 1981, being the most recent), no one has examined the effect of an organization's economic orientation, which was first suggested by Rushing in the mid-1970s. In two related articles, Rushing (1974, 1976) proposed that the economic orientation of an organization is another strategic contingency that strongly influences macro level organizational behavior. He concluded that, at least for the profit and nonprofit hospitals in his study, an institution's "profit-nonprofit orientation is a significant factor in hospital functioning" (1976, p. 689). He went on to state that his results were "consistent with the general framework of contingency theory..., which views the existence of intraorganizational relationships as contingent on other conditions...and extend the contingency framework in that they indicate

[1]The authors would like to thank T. W. Bonham for his helpful comments on an earlier draft of this manuscript.

that organizational orientation, specifically profit versus nonprofit orientation, may be a significant contingency for intraorganizational relationships" (1976, p. 689).

Virtually no research of any type has been reported in recent years that has attempted to extend or validate Rushing's conclusions. This is particularly true with regard to the effect that an organization's economic orientation might have on its strategic management processes. This lack of research has been largely because many researchers have accepted a premise that is neither supported nor refuted by the current literature and that has led to a belief that research in this area is unnecessary. According to Newman and Wallender, "*The presumption is that the basic management concepts can and should be applied to not-for-profit activities just as diligently as to profit-seeking companies*" (1978, p. 24; italics in the original). They go on to say that "the pertinent question is: Do not-for-profit enterprises have particular characteristics which make inappropriate some managerial concepts that are beneficial in profit-seeking enterprises?" (1978, p. 25).

The purpose of this study therefore was to analyze empirically one specific component of the general question posed by Newman and Wallender as it related to the earlier work of Rushing. More precisely, this study examined the relationship between an organization's economic orientation and the perceived power relationships among those who are responsible for its strategic decision making.

Method

The Focal Industry

In order to avoid the traditional problem of comparative organizational analysis (i.e., comparing what are in effect apples and oranges), a careful screening of the organizational domains was conducted along the lines suggested by Carper (1979, 1980) and Graeff (1980). The search for an industry that contained both profit and nonprofit enterprises that were technically and functionally equivalent and also could be controlled for such variables as size, age, and geographic location was not easy, but it was not hopeless either. Among the industries that lent themselves to this type of analysis were education, utilities, railroads, and health care. For a number of reasons, detailed elsewhere (Carper, 1979), hospitals were selected as the focus of this study.

Hypotheses

The hypotheses tested in this study were based on the contingency approach discussed above and the widespread belief evidenced in the literature (see Carper, 1979, for a detailed discussion) that an organization's economic orientation is an important contingency variable that can affect various intraorganizational processes and relationships. Of the many intraorganizational

relationships that might be studied in this regard, the distribution of power among top level decision makers was chosen for analysis because of its crucial strategic importance to the ultimate success or failure of an organization (Schendel & Hofer, 1979). This can be restated as a general proposition in the following way: If an organization's economic orientation is a significant contingency variable that influences the organization's overall functioning, then one could reasonably expect there to be a relationship between that orientation and the individuals or groups that are perceived as having the greatest amount of strategic decision making power. Etzioni posed this issue specifically for hospitals when he hypothesized that "different types of hospitals—municipal, proprietary, voluntary, etc.—are expected to vary in the groups they respond to most readily and in the kind of power base which has the greatest leverage" (1975, p. 281).

Hospitals have long been characterized in terms of a top management triad consisting of the institution's administrators, its board of trustees, and its medical staff (Elling, 1963; Gordon, 1961, 1962; Lentz, 1957; Perrow, 1960, 1963). Based on Etzioni's hypothesis and this triadic relationship, three specific analyses were conducted that focused on the perceived power distributions among these groups in a number of comparable profit (i.e., proprietary) and nonprofit hospitals. In essence, it was proposed that the relative power positions of the components of this triad would vary according to the economic orientation of a given institution.

Traditionally, proprietary hospitals have been the province of physicians, whereas nonprofit institutions have been dominated by community leaders. In his discussion of proprietary hospitals, Rushing noted that their "ownership and control are more likely to be lodged in the hands of one group, physicians" (1974, p. 477). Steinwald and Neuhauser determined that one reason for this pattern of proprietary ownership and control could be that "individual doctors or small groups of doctors have become dissatisfied with the lack of availability of beds for admitting their private patients and have responded by financing the construction of their own proprietary hospitals" (1970, p. 829). Thus, the literature would seem to suggest that the medical staff enjoys a preeminent power position in proprietary facilities.

The other side of the argument is that community leaders dominate nonprofit institutions primarily through their membership on boards of trustees. According to Newhouse, "One characteristic of nonprofit hospitals is that usually control formally resides in a board of trustees" (1970, p. 65). This control has evolved because, historically, nonprofit hospitals have had a much greater dependency on their local communities for both financial and nonfinancial resource support than have their for-profit counterparts (Elling, 1963; Gordon, 1962; Newhouse, 1970; Perrow, 1960, 1963; Pfeffer, 1973). Not-for-profit hospitals thus have used seats on their boards as either direct quid pro quos for various types of resource support or as linkages to strategic parts of their external environments. In either case, the price that these institutions have had to pay for this environmental co-optation has been

a loss of organizational autonomy (Thompson & McEwen, 1958). Furthermore, as a hospital continues to provide representation on its board to those who control important environmental resources, the power of the board members increases vis-à-vis the other parts of the triad (Emerson, 1962). Conversely, proprietary hospitals, which require that their operations pay for themselves, have been much less dependent on their local environments and thus have faced fewer pressures to give up part of their autonomy.

The evolution of the administrator into a coequal part of the management triad has been the most recent and least examined segment of the triangle (Rakich, Longest, & O'Donovan, 1977; Schulz & Johnson, 1976). Consequently, there is only a limited amount of published research available that can be used as a basis for a hypothesis dealing with the relative power position of the administrator vis-à-vis the board and the medical staff.

Pfeffer and Salancik's (1977) study of administrative tenure indicated that in a majority of the hospitals examined, the board of trustees selected an administrator who possessed specific qualifications that were needed by the particular institution at that point in time. The researchers also reported that as these situations changed, so did the type of administrator needed to deal with the new contingencies. These administrators thus served at the pleasure of the boards that represented local community interests. Because 55 of the 57 hospitals examined by Pfeffer and Salancik were of the nonprofit variety, it can be implied that the not-for-profit administrator would be in a subordinate position to the board and the power position of such an administrator therefore would be weak.

In contrast, administrators in proprietary hospitals generally are viewed as being in a much stronger position vis-à-vis the other two components of the triad. This is largely because proprietary hospitals are considered to be business organizations (Rushing, 1974) whose administrators are viewed as professional managers with functions closely resembling those of corporate executives (Lentz, 1957). The administrators, instead of the board, thus become the primary organization-environment boundary spanners in proprietary hospitals.

Based on the above discussion, the following hypotheses were developed.

H1: Compared to the top level decision makers in proprietary hospitals, the top level decision makers in nonprofit hospitals will rank the medical staff significantly lower in terms of its perceived power in their hospitals.

H2: Compared to the top level decision makers in proprietary hospitals, the top level decision makers in nonprofit hospitals will rank the board of trustees significantly higher in terms of its perceived power in their hospitals.

H3: Compared to the top level decision makers in proprietary hospitals, the top level decision makers in nonprofit hospitals will rank the hospital administrator significantly lower in terms of his/her perceived power in their hospitals.

Data Collection and Analysis

In order to obtain two organizational samples with highly similar domains, only short-term, general, nongovernment, nonreligious, nonteaching hospitals with 100 to 300 beds were included in the study. The American Hospital Association's (1978) *Guide to the Health Care Field* was used to identify hospitals that met these criteria. With the cooperation of the administrators of three proprietary and five nonprofit hospitals, mail questionnaires were sent to all top level decision makers who regularly participated in the strategic management processes of these institutions. The particular strategic activity that all of those surveyed had in common was the organizational goal-setting process. An initial mailing of 202 questionnaires plus two follow-ups yielded a total of 115 usable responses (57 percent), 41 of which were from individuals associated with proprietary facilities and 74 from those associated with nonprofit institutions.

The instrument used to identify the perceived power relationships present in the organizations surveyed contained a list of 27 groups and individuals who might be able to influence a hospital's organizational goal-setting process. This list was formulated from the relevant literature and a separate survey of other health care educators and professionals (Carper, 1979). Respondents to the questionnaire were asked to indicate the amount of influence they felt that these 27 individuals or groups were actually able to exert on their particular organization's goal-setting processes.

In order to provide a more comprehensive analysis of the power evaluations, two separate procedures were used. First, a forced choice approach was employed, which asked the respondents to evaluate each potential power holder by means of a 5-point scale that ranged from "no influence at all" to "a great deal of influence." Second, the respondents were given the opportunity to allocate a theoretical 100 "units of influence" among the 27 groups and individuals in any manner they desired. In both cases, the ratings for each group or individual were averaged across each economic orientation and then rank ordered to provide a power hierarchy for each economic orientation.

Goodman and Kruskal's gamma was deemed to be the most appropriate measure of association for the analysis of the forced choice responses primarily because of its proportional reduction in errors. The analysis of the open-ended, units of influence approach required the use of a t test because the data obtained were interval rather than ordinal. A $p \leq .15$ level of significance was used as the criterion for rejecting or failing to reject the proposed hypotheses because of the exploratory nature of the research. The actual levels of significance are reported here in order to allow the reader to apply his or her own test of significance.

Results

Tables 1 and 2 present the results of the analyses of Hypotheses 1, 2, and 3. The data in Table 1 are from the forced choice evaluation procedures

Table 1
Comparative Evaluation of Three Specific Power Groups Based on Their Perceived Ability to Influence Organizational Goals Forced Choice Approach[a]

Power-Related Hypotheses	*Predicted Direction Observed*	*Gamma*	*p (One-Tail)*	*Significant*[b]
H1: Compared to the top level decision makers in proprietary hospitals, the top level decision makers in nonprofit hospitals will rank the medical staff significantly lower in terms of its perceived power in their hospitals.	Yes	-.158	.264	No
H2: Compared to the top level decision makers in proprietary hospitals, the top level decision makers in nonprofit hospitals will rank the board of trustees significantly higher in terms of its perceived power in their hospitals.	Yes	.113	.330	No
H3: Compared to the top level decision makers in proprietary hospitals, the top level decision makers in nonprofit hospitals will rank the hospital administrator significantly lower in terms of his/her perceived power in their hospitals.	Yes	.000	.500	No

[a]See text for clarification.
[b]$p \leq .15$

Table 2
Comparative Evaluation of Three Specific Power Groups Based on Their Perceived Ability to Influence Organizational Goals Open-Ended Approach[a]

Power-Related Hypotheses	*Predicted Direction Observed*	*t Value*	*p (One-Tail)*	*Significant*[b]
H1: Compared to the top level decision makers in proprietary hospitals, the top level decision makers in nonprofit hospitals will rank the medical staff significantly lower in terms of its perceived power in their hospitals.	Yes	-.04	.486	No
H2: Compared to the top level decision makers in proprietary hospitals, the top level decision makers in nonprofit hospitals will rank the board of trustees significantly higher in terms of its perceived power in their hospitals.	Yes	-.85	.198	No
H3: Compared to the top level decision makers in proprietary hospitals, the top level decision makers in nonprofit hospitals will rank the hospital administrator significantly lower in terms of his/her perceived power in their hospitals.	No	-1.62	.055	Yes

[a]See text for clarification.
[b]$p \leq .15$

and show that although the predicted direction was observed for each of the three hypotheses, the results did not approach statistical significance.

Table 2 presents the results for the open-ended evaluation of each hypothesis. Although the data for Hypotheses 1 and 2 were in the predicted direction, neither hypothesis could be statistically supported. The results for Hypothesis 3 showed not only that the respondents from nonprofit hospitals gave their administrators more units of influence than did their

counterparts from proprietary facilities (opposite of the predicted outcome), but also that the observed difference between the responses of the two groups was significant.

Discussion and Conclusions

Because of sample size, methodological problems, and single industry constraints, any generalization from these results must be made with caution. Yet certain conclusions are warranted. First, because the data failed to provide support for the three power-related hypotheses, economic orientation appears to have little to do with the way power is distributed in the profit and nonprofit organizations studied here. The observed variations in rankings thus may be attributed to such factors as the particular evolutionary history of the institution or its organizational-environmental relationships rather than to its economic orientation.

Citing external environments as causal factors that explain various macro-level organizational behaviors is not a new approach. For example, Perrow (1960) concluded that hospitals go through evolutionary cycles in which they face various threats and challenges imposed by changes in their internal and external environments, forcing changes in management goals and power distributions. More recently, Pfeffer (1973) and Pfeffer and Salancik (1977) have observed that the composition of hospital boards and the characteristics and tenure of hospital administrators are contingent on demands imposed by their internal and external environments.

Several of these demands may be traced to the rapid rate of change that has characterized the entire health care industry in the last decade. One such change recently has taken place in the general economic environment. Inflation has become a way of life, and the old argument that nonprofit organizations are inherently inefficient because they lack the profit motive (Rushing, 1974; Tideman, 1977) is no longer valid, at least not for nonprofit organizations that plan to survive. Another factor contributing to environmental change may be the multitude of regulatory changes that have taken place in the last decade (Weidenbaum, 1981). Increasingly government agencies and departments at all levels, but particularly at the federal level, have become active participants in the health care process (DeBakey & DeBakey, 1980). In fact, the administrators interviewed in this study unanimously identified goverment regulation as their major external problem area.

Thus one may argue that many profit and nonprofit organizations in effect have been "forced" to adopt similar operating characteristics because of the impact of such external factors as government regulations and a worsening general economic situation. Furthermore, it seems reasonable to suggest, at least, that potential differences of the type proposed here might be more a function of these varying environmental contingencies (Hambrick, 1981) that they are of varying economic orientations.

Second, because a theoretical foundation was developed based on the available literature, it is relevant to ask why such a large disparity existed between outcomes suggested by the literature and the empirical results. Part of the disparity may be due to the dated character of the literature or the data on which these reports were based. For example, Rushing's 1974 and 1976 papers are based on survey data collected in 1969; Ruchlin, Pointer, and Cannedy's two 1973 papers used data obtained in 1970; and Newhouse's 1970 discussion of nonprofit institutions contained secondary source data from 1965 and 1962. When this is combined with the rapid rate of change that has characterized the entire health care industry in the last decade, it becomes apparent that the available literature does not provide an adequate view of the current reality.

Researchers must continue to be concerned with economic orientation as a contingency factor, even though the results presented here tend to indicate a needed revision in the traditional definitions of profit and nonprofit organizations. Newman and Wallender (1978) have argued that the current profit/nonprofit dichotomy is so general that it is impotent for use in comparative organizational research. The myth of the traditional nonprofit label also has been exposed by Davis, who, based on her longitudinal analysis of various nonprofit hospitals, concluded that "the basic assumption that nonprofit hospitals merely seek to breakeven. . . is not supported by the available evidence. Nonprofit hospitals, in fact, make rather sizeable profits and these profits have been growing over time" (1972, p. 12).

Another interpretation, and one consistent with the disparity of various studies examining the impact of other contingency factors (e.g., technology and size) on structure, is that contingency factors are relative or time bound in nature. For instance, the importance of some contingency factors may be tied to the evolutionary stage of development of the organization. Others may be related to certain environmental constraints and/or contingencies. It is certainly possible that the relationship between an organization's economic orientation and its strategic power distributions may be moderated by such factors as a worsening general economic environment and/or increasing governmental regulation. Clearly, the evaluation of these and other similar factors should be incorporated into future investigations of this topic.

In summary then, this study of top level decision makers in a number of profit and not-for-profit hospitals failed to find support for the proposition that an organization's economic orientation has a direct effect on its strategic behavior as defined by the organization's perceived power structure. Obviously, more research is needed before any definitive position can be established with regard to the causal relationship between an organization's economic orientation and its various strategic management processes.

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Social Desirability Response Effects: Three Alternative Models[1]

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Three models are developed for the effects of social desirability (SD) on organizational behavior research results. SD can act as (a) an unmeasured variable that produces spurious correlations between study variables, (b) a suppressor variable that hides relationships, or (c) a moderator variable that conditions the relationship between two other variables.

No progress accrues to any scientific discipline without adequate measurement. In the study of organizational behavior, questionnaires are the most often used method of measuring constructs. The popularity of questionnaire measures is not surprising. They are relatively easy to use and inexpensive and often are the most plausible alternative for measuring unobservable constructs such as the attitudes of organizational participants (e.g., job satisfaction), individuals' values and preferences, their intentions (e.g., to quit their job), and their personalities (e.g., needs and traits). In addition, questionnaires are commonly used to measure the perceptions of respondents regarding organizational factors (e.g., decentralization, formalization, and climate), job factors (e.g., task characteristics), work group characteristics (e.g., cohesiveness and group norms), role characteristics (e.g., role conflict and ambiguity), and the behavior of other organizational members (e.g., leadership style and job performance). In these latter questionnaires the perceptions of the respondents are what are measured; however, the purpose of the researcher often is to make inferences about what is being perceived rather than about the respondents.

In the use of any questionnaire measure, a number of factors can operate to lower its reliability and validity. The purpose of this study is to examine one of these factors—social desirability response style. Social desirability

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was chosen for several reasons: (1) an increasing number of researchers feel that as a response style it may contaminate commonly used measures used in the field of organizational behavior; (2) investigators generally hold a too simplified model of the effects of social desirability response style; and (3) social desirability contamination can serve both to mask true relationships and to produce spurious relationships. More specifically, this paper has the following objectives:

1. Develop conceptual and statistical models for the effects of social desirability;
2. Empirically demonstrate each of the conceptual and statistical models that are presented; and
3. Reach tentative conclusions about the probable seriousness of social desirability response style in organizational behavior research.

Models of Social Desirability Effects

Social desirability (SD) generally is viewed as a tendency for an individual to present him or herself, in test-taking situations, in a way that makes the person look positive with regard to culturally derived norms and standards. One interpretation of this tendency is that it represents one's propensity for faking, specifically, "faking to look good." Interest in this factor developed as early as the 1930s, when researchers sought ways to detect dissimulators taking personnel selection inventories (Humm & Humm, 1944). It was reasoned that such a tendency in test-takers would lower the predictive validity of the tests. Crowne and Marlowe (1964) attribute this behavior to individual differences in need for approval. Nunnally (1978) broadens the scope of the construct further by suggesting that there is evidence that SD has a number of sources of variance; e.g., the person's level of psychological adjustment, his or her self-knowledge, and his or her level of frankness. Nunnally's view of SD clearly encompasses more than another commonly held view that SD is merely a response bias in large part elicited by the inventory items themselves.

In the organizational research literature SD continues to be regarded as a response style to be controlled or eliminated by the researcher. Additionally, there is evidence that a number of measures commonly used in organizational behavior research are "contaminated" by SD (Golembiewski & Munzenrider, 1975; Schriesheim, 1979). For example, Stone, Ganster, Woodman, and Fusilier (1979) recently examined the convergent validity of the growth need strength (GNS) scales (Hackman & Oldham, 1975). They noted that two versions (ostensible parallel forms) of this widely used measure were significantly correlated with an independent measure of SD. Stone et al. (1979) argued that such shared variance with SD suggested validity problems with the GNS scales. In another recent study Arnold and Feldman (1981) compared different methods of measuring self-ratings of the importance of different job and organizational characteristics in making job choices. They found that the more direct, or transparent, methods

seemed to be more subject to SD bias than an indirect method. As did Stone et al. (1979), Arnold and Feldman argued that a relationship between a measure and SD constituted evidence that the measure "evokes a social desirability response bias" (1981, p. 378), and that such "bias" threatens the validity of the measure. In general, it is not surprising that such self-inventories are correlated with SD response style. In fact, many scales of the Minnesota Multiphasic Personality Inventory (MMPI), perhaps the most carefully developed and researched self-inventory extant, are significantly related to measures of SD. (See Edwards, 1970, for an extensive discussion of this large body of research.)

If the proposition is accepted that a correlation between an inventory and SD means that the inventory is contaminated with social desirability, then it is logical to explore the possible consequences of using such contaminated measures in organizational research. Presented below are three alternative models of what these consequences could be.

The Spuriousness Model

In this first model it is posited that SD contamination can produce spurious observed correlations between variables. This outcome could occur, for example, if SD were correlated with both the independent and dependent variables of interest. An observed correlation between the independent and dependent variables, then, might be due to their shared variance in SD and not due to shared variance in the constructs that the measures purport to tap. Statistically, one tests for this effect by partialling SD from the independent and dependent variables and noting whether the partial correlation is reduced to zero. One complication with this approach is that partialling underestimates the spuriousness effect when SD is measured with less than a perfectly reliable scale. A conservative approach would be to "correct" the zero-order correlations for attenuation before computing the partial correlation. In practice, however, attenuation effects due to unreliability are fairly minor when reasonably reliable scales are employed.

It is this spuriousness model that most investigators implicitly endorse when they advocate the inclusion of an SD scale in research designs. However, despite this apparent general acceptance of the spuriousness model, rare are the cases in which SD actually is incorporated into one's set of measures. In fact, even though the spuriousness model is a plausible one for the effects of SD response bias on research results, the present authors know of no evidence demonstrating that any observed correlation between organizational variables was due to the spurious effects of SD.

The Suppression Model

This second model posits that the SD response style produces just the opposite effect from that proposed in the spuriousness model. That is, a real correlation between independent and dependent variables may go

undetected because of SD contamination in one or both of the measures. Consider the following example. It is a common finding that self-inventories of effort or motivation (e.g., the internal motivation scale of the Job Diagnostic Survey) do not correlate with measures of actual performance. There are of number of reasons for such a lack of correlation, one of which is that self-perceptions of motivation (even unbiased ones) simply are not related to actual job performance. Before failing to reject this null hypothesis, however, one should consider other explanations for the lack of observed correlation (and prehaps preclude the commission of a Type II error). One such explanation is that the self-inventory of motivation is heavily contaminated by SD (a not implausible assertion) and this SD component, which has nothing to do with job performance, is masking the true relationship between motivation and performance. In this situation, partialling SD from both variables would change the relationship from zero to non-zero. This example, of course, is one of what has been termed "classical suppression" (Conger, 1974) and, hence, the reason for naming this model thus. The "classical" variety is not the only kind of plausible suppression effect, however. (See Cohen and Cohen, 1975, for a general discussion of suppression.) Suppose that the simple correlations between SD and the independent and dependent variables are positive and so is the correlation between the independent and dependent variables. Of course, this is the pattern of correlations that must exist in the spuriousness model. However, when the conservative researcher "controls for" SD by partialling, one finds that the partial correlation is bigger than the simple one. Thus, what at first glance looks like spuriousness is actually "net" suppression. In any given case the spuriousness and suppression models of SD effects are readily pitted against each other. One simply computes a multiple regression with both SD and the independent variable (X) in the equation. If the beta for X is zero, or just less than the simple correlation between X and Y, then the spuriousness model is correct. If the beta for X is bigger than the simple r (technically, outside the range of r and zero), then the suppression model is correct. Of course, the other alternative is that neither of these two models is correct. In that case, one would conclude that SD simply is not an important factor in the research. However, one more model should be considered before the issue of SD response is dismissed as unimportant.

The Moderator Model

In this model SD may or may not be correlated with either the independent or dependent variables. The distinguishing feature of this model is that there is an interaction effect between the independent variable and SD. The special case in which SD is uncorrelated with both independent and dependent variables is what traditionally has been referred to as the moderator effect in the personnel selection literature (Saunders, 1956; Zedeck, 1971).

It is reasoned that the moderator model of SD effects might operate when the research issue involves the operation of implicit theories (DeNisi & Pritchard, 1978; Rush, Thomas, & Lord, 1977), especially when there is an implicit theory that a respondent considers "correct," and thus socially desirable to espouse. Consider the following example. An investigator wishes to test the hypothesis that a leader who uses contingent rewards will have more satisfied subordinates than will one who does not use contingent rewards. The investigator then has subordinates complete an inventory measuring the extent to which their leader uses contingent rewards and a self-inventory measuring their level of satisfaction with their leader. Now suppose that this population of subordinates has been acculturated to accept the implicit theory that "good" leaders reward people on the basis of their performance. There is no particular reason to suspect that high SD respondents will be more likely to yield higher scores on either the leader behavior inventory or the satisfaction self-inventory, so a measure of SD turns out to be uncorrelated with them. Assume that the observed correlation between leader behavior and satisfaction is .30 and it is statistically significant. What is one to conclude? This result might be interpreted to mean that there *is* a relationship between the two variables, but because it accounts for only 9 percent of the variance, it is of only modest interest. However, it is argued that the real relationship might be very different, perhaps even a significant negative correlation. Suppose that there is an interaction effect between the measure of leader behavior and SD such that for people high in SD the observed correlation is strong positive, and for people low in SD the correlation is somewhat negative. For an "average" level of SD the relationship is moderate positive (i.e., $r = .30$). Obviously, the correlation between the measure of leader behavior and satisfaction is contingent on the respondent's level of SD. Letting significant interactions go undetected leads the investigator to make misleading interpretations about general main effects when the actual simple main effects paint a very different picture (Winer, 1971).

The Arnold and Feldman (1981) study suggests another example of a moderating effect of SD. They asked respondents to indicate, using various methods, the importance of different job factors. They reasoned that most people would find it socially desirable to indicate a preference for intrinsic factors rather than extrinsic sorts of factors such as pay and benefits. Now suppose that people were asked, instead, to evaluate the degree to which intrinsic and extrinsic factors were present on various jobs (variable X) and then were asked to indicate their preference for these jobs (variable Y). The findings of Arnold and Feldman (1981) and Stone et al. (1979) would suggest that a measure of SD would be uncorrelated with X and Y but would moderate the relationship between X and Y.

To test whether SD is a moderator variable, one tests for an interaction between it and any independent variable(s) of interest using product terms in hierarchical multiple regression (Cohen & Cohen, 1975). The term "moderator" here refers to interaction effects. Thus, the noninteracting

"homologizer" moderator variable recently described by Sharma, Durand, and Gur-Arie (1981) is not of interest in the present case (nor is its associated subgroup analysis technique). Two points regarding the assessment of SD moderating effects should be stressed. First, the partial correlation and regression method without interaction terms, used to test for the spuriousness and suppression models, will not uncover moderator effects. Second, when one partials a variable from any relationship one is actually performing an analysis of covariance (more generally, an analysis of partial variance, Cohen and Cohen, 1975). For such partialling to be valid, one makes the assumption of homogeneity of regression, that is, that the regression of the covariate with Y is the same across all levels of X. To test this assumption, one tests for an interaction effect between the covariate and X. Therefore, one always should test the moderator model of SD effects first and, if no interaction is found, then examine the regression results for evidence of spuriousness or suppression.

These three models produce very different outcomes and can grossly affect the substantive interpretation of any given research question. Further, the three models are mutually exclusive and are readily tested against each other. They thus form the basis for a strong inference strategy in research (Platt, 1964). The illustrated examples of each of these models are intended not so much to document the existence of such SD effects, but rather to demonstrate their occurrence in a data set composed of commonly used measures obtained from a sample fairly typical of those employed in much organizational research.

Method

Sample

As part of a larger study, data were collected from a total of 424 managerial and nonmanagerial employees in three diverse organizations.

Financial Institution. A representative sample of 257 employees from the highest to lowest levels, performing all functions, was taken from a relatively large financial institution. The median age was 36; 106 had completed college, and 16 held graduate degrees. Median tenure with this organization was 8 years.

Manufacturing Plant. A representative sample of 87 employees from the highest to lowest levels, performing all functions, was taken from this medium sized plant. The median age was 36; 19 had completed college, and 3 had not completed high school. Median tenure with the firm was 10 years.

State Agency. A representative sample of 80 employees from the highest to lowest levels, performing all functions, was taken from a relatively large agency of state government. Median age was 35; 25 had completed college, and 5 held graduate degrees. Median tenure with this agency was four years.

Measures

In order to illustrate the potential effects of SD on relationships among organizational variables, measures were chosen so as to represent individuals' self-reports of (a) role characteristics (role conflict and ambiguity), (b) others' behavior (leader descriptions), (c) their needs, and (d) their attitudes.

Each employee completed a packet of questionnaires while at work. Included in this packet were (a) role conflict and ambiguity scales (Rizzo, House, & Lirtzman, 1970), (b) leader behavior description scales from the managerial behavior survey (MBS) (Yukl & Nemeroff, 1979), (c) need for achievement, affiliation, autonomy, and power scales from the manifest needs questionnaire (MNQ) (Steers & Braunstein, 1976), and (d) satisfaction with pay, work, supervision, co-workers, and promotions from the Job Descriptive Index (JDI) (Smith, Kendall & Hulin, 1969). Finally, SD was measured with the Marlowe-Crowne scale (Crowne & Marlowe, 1964). The preceding are all relatively familiar measures in organizational research, with the possible exception of the MBS. The MBS was developed in an attempt to overcome criticisms of previously existing leadership measures and consists of 76 items intended to measure 19 categories of leader behavior, using 4 items per subscale. In the present study the subscales used were (a) consideration, (b) structuring reward contingencies, (c) decision participation, (d) goal setting, and (e) role clarification.

The variables measured in the present study thus represent some of the most commonly examined constructs in organizational behavior. For present purposes of illustrating the effects of SD, the JDI satisfaction scales were considered as dependent variables predicted by the leadership variables, needs, and role perceptions. The role perception variables also were considered as dependent variables predicted by leadership variables and needs.

Results and Discussion

Table 1 displays the means, standard deviations, reliabilities, and correlations with SD of all study variables. About a third of the scales were significantly correlated with SD. Given that the self-descriptions tend to have a larger SD component than do descriptions of others or others' behavior, it is not surprising that two of the MNQ scales (nAut and nPow) are correlated with SD. It is noted that the role conflict and ambiguity scales also are significantly contaminated by SD, with those high in SD showing a tendency to report less of both role stresses. Inspection of the wording of the conflict and ambiguity items, however, reveals that almost all the items are really self-descriptors (e.g., "I am uncertain as to how my job is linked"). Thus, the scales probably are best described as self-inventories, and as with other self-inventories, it would not be unusual to find SD contamination.

The rest of the analysis proceeded by examining the three SD models on each independent-dependent variable pair, using the regression methods

Table 1
Descriptive Statistics

	M	*SD*	*Reliability*	*Correlation with SD*[a]
SD	17.2	6.24	.80	—
Consideration (MBS)	3.9	.79	.86	.17**
Structure (MBS)	3.4	.85	.76	.00
Goal-setting (MBS)	3.1	1.02	.91	.00
Participation (MBS)	3.0	.89	.89	.07
Role clarification (MBS)	3.5	.88	.90	.07
JDI pay	25.6	12.38	.76	-.02
JDI work	36.9	9.74	.76	-.03
JDI promotion	23.6	16.28	.88	.05
JDI co-workers	43.6	10.49	.82	.03
JDI supervision	38.9	8.38	.71	.08
Role conflict	2.5	.77	.73	-.28**
Role ambiguity	2.3	.83	.83	-.27**
nAch	4.0	.50	.65	.03
nAff	3.0	.49	.52	.10
nAut	2.6	.58	.63	-.28**
nPow	3.3	.86	.60	-.13*

[a]With listwise deletion of missing or incomplete cases, $N = 280$.
*$p < .05$
**$p < .01$

described above. To conserve space, only those instances in which there were significant SD effects are illustrated.

Moderator Effects

In four relationships SD was found to have significant moderating effects, and these are displayed in Table 2. Two of these cases are examples of the "true" moderator model (Saunders, 1956; Zedeck, 1971) in that the

Table 2
Illustrations of SD Moderator Effect

Dependent Variable	*Independent Variable*	*B*	*t*	*R*
Case #1: JDI promotions	SD	2.19	2.13*	
	nAff	15.91	2.48*	
	SD × nAff	-.72	-2.13*	
	Intercept	19.35		.16*
Case #2: JDI work	SD	-.99	-2.07	
	nAut	-7.75	-2.49	.19**
	SD × nAut	.33	2.09*	
	Intercept	59.97		
Case #3: JDI supervision	SD	.67	2.10*	
	Structure	7.71	4.58**	
	SD × structure	-.16	-2.07*	
	Intercept	10.27		.49**
Case #4: Role conflict	SD	-.10	-3.10**	
	nAut	-.16	-.74	
	SD × nAut	.03	2.37*	
	Intercept	3.37		.39**

*$p < .05$
**$p < .01$

simple correlations between SD and both the independent and dependent variables are not significantly greater than zero. This holds for case #1 (JDI promotions and nAff) and case #3 (JDI supervision and MBS structure). Examining the interactions, one finds that in the case of JDI promotions, the effects of nAff become less positive with increases in the level of SD, and actually become negative at high levels of SD. For example, at SD = 5 the raw regression weight for nAff is 12.31; at SD = 30 the nAff regression weight is -5.69. An investigator interested in the relationship between nAff and satisfaction with promotions might have concluded that they were unrelated, while, in fact, they are positively related for low SD individuals and negatively related for high SD individuals. In a similar vein (case #3), SD might have been dismissed as irrelevant because it was uncorrelated with both independent and dependent variables. In fact, the relationship between structuring of reward contingencies and satisfaction with supervision is more positive for low SD individuals than for high SD individuals.

The case #2 moderating effect of SD on the nAut–satisfaction with work relationship is one in which SD is uncorrelated with the dependent variable but *is* correlated with the independent variable. Finally, case #4 is of some interest because here SD is correlated with ***both*** the independent and dependent variables yet it significantly moderates the relationship between them.

Suppression Effects

Two cases were discovered in which SD acted to mask a relationship between two other variables. The first case involved the relationship between leader consideration and satisfaction with work. The simple correlations between these variables is not significant at $r = .07$. However, when SD is controlled the partial r between the variables is .13, which is significant at $p < .05$. In the case of leader decision participation and satisfaction with work, the correlation is increased from .13 to .18 when SD is partialled. Although neither of these suppression effects is dramatic, an investigator, at least in the first case, would have concluded that no relationship existed when, in fact, one did exist but was obscured by SD contamination of the satisfaction with supervision scale.

Spuriousness Effects

Three cases were found that exhibited evidence that observed correlations between independent and dependent variables were attributable in part to shared variance in SD. The first case involved the relationship between leader role clarification and role conflict. The zero-order correlation between these scales was -.20 ($p < .01$); the partial r (controlling for SD) was -.14 ($p < .05$). The simple r was reduced somewhat but remains significant nonetheless. In the second case, partialling SD reduced the correlation between nAut and role conflict from .30 ($p < .01$) to .24 ($p < .01$). Not only does this effect appear minor, but, as discussed above, the primary role

of SD in this relationship is really as a moderator variable. Finally, partialling SD reduced the correlation between nAut and role ambiguity from .17 ($p < .05$) to .10 ($p < .10$). Although one might argue later that this latter effect is a true demonstration of spuriousness because the partial correlation no longer meets an arbitrary level of significance (alpha = .05), the real effect of SD is in fact quite small.

Conclusions

Two conclusions seem warranted from this investigation. First social desirability contamination effects do not seem very widespread. SD effects were examined in 73 different bivariate relationships in this study. By any standard, that represents quite a "fishing expedition." However, only 9 cases were uncovered in which SD showed any evidence of influencing the observed relationship between two other variables. Admittedly, variables were not systematically chosen that most likely would be influenced by SD. Rather, they were chosen for a "representative" sampling of variables. On a priori grounds, and consistent with the findings, those variables most likely to be affected by SD are self-inventories. It is recommended, then, that SD be assessed in those studies whose central hypotheses involve self-inventories. This would include the use of such measures as self-reports of effort, motivation, performance, and attributions of performance.

Second, the empirical results are consistent with the statistical reasoning that when SD affects research findings, spuriousness is not the only, or even most likely, result. In fact, the most common finding in the empirical examples here is that of a moderator role for SD. In addition, in half of the moderator cases, SD was unrelated to either the independent or dependent variable. This suggests that SD is of interest as a variable in its own right and not just as a source of bias in measurement. As noted earlier, SD may play a significant role in the operation of implicit theories; in such cases it would act primarily as a moderator variable.

In conclusion, social desirability can affect research findings in three different ways: (a) produce spurious results; (b) hide real results (suppression); and (c) moderate relationships. Because SD can be measured fairly reliably in less than ten minutes of respondents' time, there seems to be no good reason why these three models should not be tested in any organizational behavior study—especially those studies that incorporate self-inventory measures and those that test relationships in which an implicit theory might be operable.

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Research Notes

ORGANIZATIONAL COSMOPOLITANISM AND INNOVATIVENESS[1]

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This paper proposes a typology of cosmopolitanism that represents the bureaucratic and professional perspectives within an organization. This typology then is related to the innovativeness of organizations. The setting for the study is hospital acquisition of medical innovations.

The cosmopolitanism variable is a familiar one in behavioral research. It has its roots in the conceptualization of cosmopolitans and locals as ideal types (Gouldner, 1957; Merton, 1957). "Cosmopolitans" are oriented beyond their community or organization, whereas "locals" are oriented toward their immediate community or organization. The organizational behavior literature frequently has included cosmopolitanism as an indicator of "professionalism" in exploring theories of organizational innovativeness (Hage & Dewar, 1973; Pierce & Delbecq, 1977).

The stream of research relating cosmopolitanism and innovativeness usually has found a positive relationship (Rogers, 1983). Within the medical social system, it generally has been found that cosmopolitanism is associated positively with early adoption of innovations (Coleman, Katz, & Menzel, 1966; Kimberly, 1978; Kimberly & Evanisko, 1981), although Counte and Kimberly (1974) found a lack of a relationship, suggesting that the cosmopolitanism-innovativeness relationship depends on the innovation under study—in their case a locally-oriented educational program rather than a new technology.

Nevertheless, research on cosmopolitanism and innovativeness has been conducted almost exclusively at the *individual* level, or at the *aggregate organization* level, and has not focused on the *intraorganizational* level. That is, research has assessed the cosmopolitanism-innovativeness relationship for individual actors, such as physicians, or it has assessed this relationship for the total organization based on aggregate measures of the organization's cosmopolitanism; but it has not assessed the cosmopolitanism-innovativeness relationship based on intraorganizational analysis with multiple participants representing the same organization.

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A central objective of the present paper, therefore, is to focus on the relationship between cosmopolitanism and innovativeness based on an intra-organizational measure of cosmopolitanism. This requires operationalization of the cosmopolitanism variable taking into consideration the multi-person nature of organizational decision making. In fact, both the administrative and medical perspectives on innovation are examined. This would seem to be advisable given the bureaucratic-professional conflict that has been demonstrated in organizational research (Benson, 1977; Hall, 1968). This research, and the corresponding research in organizational buying behavior (Bonoma & Zaltman, 1978), has shown the presence of incongruency in attitudes, perceptions, and values among organizational participants. Hence, reliance on a single organizational member to explain the organization's behavior is inadequate.

Conceptualization

The key to this paper conceptually is the recognition that organizational cosmopolitanism cannot be measured based on the orientation of a single organizational member. Rather, it should be assessed for all the relevant participants in the organizational "buying center," that is, those members of the organization relevant to a particular purchase decision (Webster & Wind, 1972). In professionally-oriented organizations (hospitals, universities, research laboratories, etc.) the relevant buying center includes at least two organizational members representing the bureaucratic and professional components of the decision making unit.

In the case of hospitals, the bureaucratic role is represented by the hospital administrator and the professional role by a senior physician for the department that would use the innovation. Thus, for this assumed two-member buying center, at the minimum there are four types of organizational cosmopolitanism *patterns*. These are based on the cosmopolitanism scores for the two participants.

This conceptualization is presented in Figure 1. Essentially, for a two-member buying center, and for the simple dichotomy of cosmopolitan versus local, a 4-cell classification of organizational cosmopolitanism, relevant to assessing an organization's likelihood to engage in innovative behavior is posited.

Figure 1
A Typology of Organizational Cosmopolitanism

		Professional Orientation: Cosmopolitan	Professional Orientation: Local
Administrative Orientation	Cosmopolitan	1. Cosmopolitan Consensus	2. Conflict
	Local	3. Conflict	4. Local Consensus

Expectations for organizational adoption of innovation by the four cosmopolitanism types are as follows:

- *Cosmopolitan consensus* (Cell 1). In this cell both the bureaucratic and professional participants are cosmopolitan; that is, their orientation is toward the broader hospital/medical community and to the innovative values of this social system. The hypothesis here is straightforward: *organizations with a cosmopolitan consensus will be innovative.*
- *Local consensus* (Cell 4). Here both the bureaucratic and professional participants have a local (i.e., intrahospital) orientation. The hypothesis is that *organizations with a local orientation will be late adopters of innovations.*
- *Conflict* (Cells 2 and 3). Under conditions in which the bureaucratic and professional participants load oppositely on the cosmopolitanism dimension, a situation of conflict exists and the innovativeness of the hospital is in doubt. Nevertheless, the assumption is that the initiating force in hospital adoption of innovations is the professional component. Therefore, it is hypothesized that *organizational innovativeness will be more pronounced under conditions in which the professional component is cosmopolitan and the bureaucratic component local, than the reverse.*

Method

In order to test the conceptualization of cosmopolitanism proposed and the relationship to innovativeness, a subset of data developed in research with hospitals (Robertson & Wind, 1980) is analyzed. In order to represent the buying center, the research included both administrative (bureaucratic) and radiology (professional) respondents. The measurement of innovativeness is based on the number of radiology innovations adopted by a hospital from a list of seven—ultrasound, head CT-scanners, body CT-scanners, nuclear imaging, thermography, mammography, and arteriography. These seven innovations were selected, based on frequency of mention, from a longer list developed in interviews with radiology expert judges in a pilot study.

The data are derived from a mail survey of hospitals, including both administrative and professional respondents. The hospitals included in the universe comprise: (1) a census of all hospitals (excluding specialty care hospitals, such as psychiatric) that had adopted a CT-scanner as of the date of the study and (2) a sample of nonadopter hospitals matched on number of beds and region of the country with the CT-scanner adopter hospitals. Questionnaires were mailed to both the administrative and professional (radiologist) positions at each hospital, thus allowing the assessment of both perspectives within the buying center of each hospital. The total data set includes 209 hospitals—a response rate of 34 percent—although this analysis is based on 182 hospitals with complete data for both respondents on all of the variables in question.

The cosmopolitanism construct has been operationalized somewhat inconsistently over the years since Gouldner's (1957) identification of six factors differentiating cosmopolitans from locals in the university environment based on an elaborate set of attitudinal questions. The most common measurement thrust, however, has been in terms of external information activity (Coleman et al., 1966; Hage & Dewar, 1973; Kimberly, 1978).

In the present study the cosmopolitanism variable was operationalized based on a principal components factor analysis of eight variables pertaining to cosmopolitanism derived from some of the leading studies in the literature. This resulted in four factors (with an eigenvalue greater than 1.0) as shown in Table 1, which would seem to be described as: (1) journal publications, (2) attendance at professional meetings, (3) offices held in professional associations, and (4) journal readership.

Table 1
Cosmopolitanism Factor Structure and Loadings

Items	*Factor 1*	*Factor 2*	*Factor 3*	*Factor 4*
Professionals				
Number of articles published last year	.86			
Number of articles ever published	.79			
Local professional association meetings		.79		
National professional association meetings		.68		
Offices held in national associations			.87	
Offices held in local associations			.80	
How extensively read journals				.77
Number of journal subscriptions				.71
Cumulative explained variance	(.27)	(.44)	(.57)	(.68)
Administrators				
Local professional association meetings	.83			
National professional association meetings	.80			
Number of articles published last year		.87		
Number of articles ever published		.87		
Offices held in national associations			.83	
Offices held in local associations			.78	
Number of journal subscriptions				.80
How extensively read journals				.42
Cumulative explained variance	(.25)	(.41)	(.56)	(.68)

These factors explain 68 percent of the variance for both the administrator and professional respondents. Because both sets of factors are relatively consistent (as assessed by a split sample factor analysis for each group) and each factor included two items, a single cosmopolitanism score for each respondent was developed based on the eight items, each given equal weight.

Results

The organizational cosmopolitanism-innovativeness relationship was first examined by correlating the individual cosmopolitanism scores (treated as a continuous variable) against the number of innovations adopted by

the organization. The radiologist cosmopolitanism score was positively correlated with organizational innovativeness ($r = .32$). The administrator's cosmopolitanism score, on the other hand, showed no relationship ($r = -.02$).

These single person results are not particularly insightful, however, and are inconsistent with the notion of a buying center and the need to analyze joint participant scores for each organizaton. Yet, they do highlight the risk involved in assessing organizational cosmopolitanism based on the characteristics of a single respondent; that is, depending on the person selected (whether administrator or radiologist), the ability to explain the hospital innovativeness varies widely.

Next, the cosmopolitanism-innovativeness relationship is examined on a multiperson organizational basis. Hospital innovativeness is shown in Figure 2 for each cell of the two-person cosmopolitanism categorization. Results are as follows:

1. The situation in which both the professional and administrative participants are local is indeed associated with the lowest level of hospital innovativeness, as hypothesized. Here the average number of innovations acquired (from a total of 7) was 3.74.
2. The cell representing both cosmopolitan professionals and administrators, however, although high on innovativeness (4.53 innovations acquired), is not the highest level of innovativeness, as was hypothesized.
3. The highest level of innovativeness (4.77 innovations acquired) is under conditions in which the professional participant is cosmopolitan and the administrative participant is local.

Figure 2
Hospital Innovativeness by Cosmopolitanism Categories[a]

		Professional Orientation	
		Cosmopolitan	Local
Administrative Orientation	Cosmopolitan	4.53 ($\sigma = 1.32$) $N = 43$	4.06 ($\sigma = 1.83$) $N = 48$
	Local	4.77 ($\sigma = 1.40$) $N = 48$	3.74 ($\sigma = 1.75$) $N = 43$

[a]Innovativeness mean score based on number of new technologies acquired out of a total of seven innovations.

Further exploration of the relationship between cosmopolitanism and innovativeness was conducted, focusing on whether the hospital had adopted a CT-scanner. Results indicated the same pattern as for total innovativeness. The highest level of CT-scanner adoption (58.3 percent) was for hospitals represented by a cosmopolitan professional and a local administrator. The lowest level of CT-scanner adoption (32.6 percent) was for hospitals represented by both local professional and administrative participants.

That innovativeness is highest when the professional participant is cosmopolitan in orientation and the administrative participant is local is to be noted. It might suggest that the professional advocates the idea and the administrator has enough power because of his local orientation to bring about the change. In further research, however, one would want to measure more explicitly the dominant value system of each participant's reference group. Although research has documented the innovation proneness of medical social systems in general, it might be that cost containment is the dominant value for cosmopolitan administrators and that prestige is accorded for performance on this attribute. If so, it might be (consistent with the results found here) that it is local administrators who are more likely to be innovative when the professional component also is innovative.

An alternative explanation might be based on an assessment of the power structure within the professional-administrator dyad. It may be that when the physician is cosmopolitan, his or her bargaining power is strengthened when matched with a local administrator and, therefore, innovativeness is more likely. If, in contrast, the administrator is also cosmopolitan, and thus presumably a more powerful personage, the physician has less bargaining power, thus potentially reducing innovativeness.

Conclusion

The use of a typology of organizational cosmopolitanism, combining the administrative and professional cosmopolitanism levels, would seem to have value for research on organizational innovativeness. The cosmopolitanism typology results in different levels of innovativeness by segment. The highest innovativeness is exhibited by hospitals characterized by a cosmopolitan professional and a local administrator, and the lowest innovativeness is exhibited by hospitals with a local professional and a local administrator.

Predicting the hospital's level of innovation is improved by redefining organizational cosmopolitanism as the *pattern* of cosmopolitanism among relevant members of the buying center. This suggests the need to focus on organizational buying centers and not on a single organizational respondent. Particularly, it is necessary to include the bureaucratic and professional perspectives within an organization.

Further research on organizational cosmopolitanism might explore the value of the present conceptualization of cosmopolitanism as an explanatory construct that may apply to other behaviors beyond innovativeness and to other types of organizations. In addition, the concept should be extended to include organizational decisions with more than two participants. In this case a more complex formulation might be required, taking into account coalition formation and other negotiative tactics among members of the buying center. Finally, it would be desirable to measure explicitly the cosmopolitan and local value systems in order to predict behavior more satisfactorily.

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EVALUATION OF JOB ANALYSIS METHODS BY EXPERIENCED JOB ANALYSTS[1]

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Job analysis is a process by which jobs are subdivided into elements, such as tasks, through the application of a formalized, systematic procedure for data collection, analysis, and synthesis (McCormick, 1976). At present numerous methods are available for accomplishing job analysis (Biddle, 1977; Christal, 1974; Fine & Wiley, 1971; Fleishman, 1975; McCormick, Jeanneret, & Mecham, 1972; Primoff, 1975; Tornow & Pinto, 1976; U.S. Department of Labor, 1972). This plethora of methods may be considered to be a fortunate state of affairs, or a dilemma. The essence of the dilemma is whether any method of job analysis is superior, relative to any other method, in its validity and usefulness (Ash & Levine, 1980; Levine, Ash, & Bennett, 1980; Prien, 1977).

Unfortunately, very few systematic, scientifically conducted studies of this problem are available. Much of the previous work may be characterized more as case studies and experience-based accounts than as carefully controlled, experimental studies (Levine et al., 1980). It will be quite some time before the necessary scientific evidence is accrued. Yet job analyses continue to be conducted, apparently at an increasing rate. These considerations led Ash and Levine (1980) to pose a *mid-range strategy* to obtain the information for comparing methods. The strategy consisted of gathering systematically the opinions of experienced job analysts about the quality and practicality of available job analysis methods. The information yielded by this approach would be supplemented and eventually supplanted as scientific evidence on the relative efficiency and effectiveness of job analysis methods grows.

The present authors selected seven job analysis methods for this study and had experienced job analysts evaluate them by means of a mailed questionnaire. The seven job analysis methods were the critical incident technique

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(Flanagan, 1954), Position Analysis Questionnaire (McCormick et al., 1972), job element method (Primoff, 1975), ability requirements scales (Fleishman, 1975), functional job analysis (Fine & Wiley, 1971), task inventory–CODAP (Christal, 1974), and threshold traits analysis (Lopez, Kesselman, & Lopez, 1981). The job analysis methods were chosen on the basis of their wide use and/or the extent to which they differed from each other methodologically.

Method

Subjects. Of those solicited through advertisements and personal contacts, 93 participants (a 61 percent response rate) completed and returned questionnaires. Participants were required to have used at least two different job analysis methods and to have analyzed at least two different job classes in their past work. Authors of job analysis methods included in this survey were not invited or allowed to serve as participants.

The median age of the participants was 33. Although the median amount of job analysis experience was 6.3 years, 86 percent of the participants had in excess of 2.5 years of experience; 82 percent were male. Participants were affiliated with colleges and universities (18 percent), state and local government agencies (18 percent), private business (17 percent), private consulting firms (13 percent), the federal government (10 percent), quasi-public firms (e.g., utilities) (6 percent), the military (3 percent), and miscellaneous (e.g., nonprofit research organizations) or more than one type of organization (14 percent).

Survey Instrument. The survey instrument was composed of two parts. Part 1 contained descriptions of the seven job analysis methods. Each of these was abstracted from published material, technical reports, and, in some cases, personal communications with the developers of the method. Attempts were made to keep length comparable and reading difficulty to a minimum. The descriptions were edited to remove any evaluative statements. The outline used for all descriptions contained the following headings: name of technique; primary authors/developers; units of analysis, scales and rationale for their use; types of persons who may gather information; types of persons who may supply the data; persons who may analyze/interpret the information; data gathering instruments and techniques; form of final product; procedure; and time for completion. If information about any of these aspects was lacking in manuals or other sources, it was left out of the description. The ordering of the descriptions was based on previous research on familiarity (Levine, Bennett, & Ash, 1979). Descriptions of the methods presumed to be *less* familiar were placed at the beginning of Part 1 in an attempt to counteract the effect of familiarity.

Part 2, the questionnaire, consisted of three sections. Section I covered the effectiveness of the job analysis methods. In the first part of the section, respondents were to rate each of the methods on a 5-point scale of how effective the method is for each of 11 organizational purposes (e.g.,

job description, job classification). A response of 1 indicated that the information yielded by a method was not at all comprehensive and was low in quality. A response of 5 indicated that the information was extremely comprehensive and extremely high in quality. The 11 purposes are listed in Table 1. The section also contained supplemental questions relating to whether the respondent preferred a combination of methods to one alone when all organizational purposes were considered, whether a particular combination of methods was used in the respondent's job analysis work, and whether the respondent knew of a job analysis method as good as or better than any of the seven methods included in the survey.

Section II of the questionnaire required that the respondent rate the methods on 11 practicality scales (e.g., respondent/user acceptability; see Table 2 for a listing of the practicality variables). These practicality concerns were rated on a 5-point scale (1 = low practicality to 5 = high practicality); for example, the scale for the cost factor ranged from 1 = prohibitively high costs would be expected to 5 = negligible costs—job analyses would be relatively cheap.

Section III of the questionnaire covered demographic information and extent of familiarity with the seven job analysis methods (1 = not at all familiar to 4 = highly familiar).

Procedure. Potential participants were advised of the nature of the study and of the criteria for participation. A pledge was made to keep all individual responses confidential. Survey participants reviewed the descriptions of the methods, completed the ratings and other questions based on the descriptions and their previous experience with the methods, and returned the questionnaires in stamped, preaddressed envelopes.

Statistical Analyses. The primary analytical technique employed on the survey data was a 2-way univariate ANOVA with repeated measures of job analysis methods. Organizational affiliation was the second independent variable. The job analysis variable had seven levels, each corresponding to a method. The organizational affiliation variable had four levels: academic, public sector, private sector, and miscellaneous, which consisted of those respondents who could not be classified in the other three groups.

The dependent variables in these 22 primary analyses were the effectiveness and practicality ratings. If a significant main effect of job analysis methods was found for any dependent variable, Tukey tests were used to analyze pairwise mean differences between job analysis methods. Only results significant at $p < .05$, two-tailed, will be discussed.

Results

Analysis of Ratings. Before proceeding with an analysis of the ratings, the background variables, sex of participant, and amount of job analysis experience were correlated with the ratings. The small number of significant correlations and their generally low magnitude suggested that separate analyses by sex and amount of experience were not warranted. Familiarity with methods also was explored as a possible influence of observed rating differences. Correlational data suggested that its effects were relatively small.

Table 1
Effectiveness Ratings of Seven Job Analysis Methods for Eleven Organizational Purposes[a]

Purposes	Job Analysis Methods							F[b]	$p<$	η^2
	Threshold Traits Analysis	*Ability Requirements Scales*	*Position Analysis Questionnaire*	*Critical Incident Technique*	*Task Inventory/ CODAP*	*Functional Job Analysis*	*Job Elements Method*			
Job description	2.95[c] (1.01)	2.15 (.97)	2.86[c] (1.09)	2.59[c] (1.15)	4.20[d] (.94)	4.07[d] (.97)	2.66[c] (1.03)	54.58	.0001	.32
Job classification	3.11[c] (1.00)	2.61[d] (1.07)	3.67[e] (.97)	2.19 (.95)	4.18[f] (1.00)	3.81[ef] (.97)	2.73[cd] (1.11)	50.82	.0001	.30
Job evaluation	2.80[c] (.93)	2.44[cd] (1.04)	3.70[e] (1.03)	2.37[d] (1.13)	3.46[e] (1.08)	3.52[e] (.90)	2.72[cd] (1.06)	26.91	.0001	.18
Job design	2.73[cd] (1.03)	2.28[e] (1.09)	2.99[c] (1.13)	2.52[de] (1.10)	3.72[f] (1.13)	3.64[f] (.99)	2.59[de] (1.08)	28.25	.0001	.18
Personnel requirements/specifications	3.68[c] (.87)	3.51[cd] (1.09)	3.36[cd] (1.03)	2.86[c] (.98)	3.19[de] (1.13)	3.58[c] (.94)	3.64[c] (1.19)	9.24	.0001	.07
Performance appraisal	2.80[cd] (1.11)	2.75[c] (1.14)	2.72[c] (1.06)	3.91[e] (1.12)	3.24[df] (1.15)	3.58[ef] (1.13)	3.07[cd] (1.12)	18.07	.0001	.13
Worker training	2.74[c] (1.13)	2.78[c] (1.13)	2.76[c] (1.03)	3.42[d] (.96)	3.65[d] (1.03)	3.63[d] (1.07)	3.33[d] (1.06)	16.03	.0001	.12
Worker mobility	2.67[c] (1.01)	2.47[cd] (1.05)	2.78[ce] (1.05)	2.20[d] (.96)	3.34[f] (1.09)	3.07[ef] (.94)	2.62[c] (.98)	18.60	.0001	.11
Efficiency/safety	2.34[cd] (1.02)	1.90[c] (.95)	2.46[de] (1.09)	3.08[f] (1.30)	2.79[ef] (1.05)	2.81[ef] (1.08)	2.30[cd] (1.07)	14.28	.0001	.10
Manpower/workforce planning	2.61[cd] (.98)	2.32[ce] (.93)	2.83[df] (1.06)	2.24[e] (.88)	3.41[g] (1.14)	3.11[fg] (1.06)	2.60[cde] (1.11)	20.65	.0001	.12
Legal/quasilegal requirements	2.65[cd] (1.06)	2.44[c] (1.13)	3.03[de] (1.06)	2.66[cd] (1.14)	3.67[f] (1.17)	3.38[ef] (1.09)	2.79[cd] (1.14)	17.45	.0001	.11

[a]Means are the top numbers. Standard deviations are the numbers in parentheses. The sample size ranges from 91 to 93.

[b]F-ratios, probability, and η^2 values are for the effect of the job analysis method, as derived from a two-way repeated measures ANOVA (job analysis method × organizational affiliation).

[cdefg]Means in each row with the same superscripts are not significantly different from each other.

Because organizational affiliation is of interest only as it interacts with job analysis methods, main effects due to organizational affiliation will not be described further; only two such significant main effects were found in the 22 ANOVAs.

Organizational Purposes. Table 1 contains the data on the effectiveness ratings of seven job analyses methods for eleven organizational purposes. For each of the 11 organizational purposes, there was a significant main effect of job analysis methods on effectiveness ratings. Therefore, results of pairwise comparisons between methods with Tukey tests form the basis for the narrative to follow. However, remarks are confined to those cases in which the magnitude of effect (η^2) was .15 or greater.

Job description. The task inventory approach combined with the CODAP computer programs (TI/CODAP) and functional job analysis (FJA) was rated significantly higher for the purpose of job description than all of the other job analysis methods. The ability requirements scales (ARS) method was rated significantly lower than all of the other job analysis methods for this purpose.

Job classification. For the purpose of job classification, TI/CODAP and FJA were rated highest, although FJA was not rated significantly higher than the Position Analysis Questionnaire (PAQ). The critical incident technique (CIT) was rated significantly lower than all the other job analysis methods for job classification.

Job evaluation. The PAQ, FJA, and TI/CODAP were rated significantly higher than all other job analysis methods for the purpose of job evaluation.

Job design. For the purpose of job design, TI/CODAP and FJA were rated higher than all of the other job analysis methods. The PAQ was rated significantly higher than the job element method (JEM), CIT, and ARS, but not significantly higher than the threshold traits analysis (TTA).

Overall, for all but 3 of the 11 organizational purposes, at least one job analysis method was rated (when the ratings are rounded to the nearest integer) as providing very comprehensive and high quality information. For worker mobility, efficiency/safety, and manpower/workforce planning purposes, job analysis methods were rated as providing information that is only moderately comprehensive and moderately high in quality at best.

Practicality Concerns. Table 2 contains the data on the practicality ratings. For each of the 11 practicality criteria there was a significant main effect of job analysis methods on practicality ratings. Therefore, results of significant pairwise comparisons between methods with Tukey tests form the basis of the narrative to follow. Again, remarks are confined to those variables with a magnitude of effect (η^2) of .15 or greater.

Standardization. In terms of standardization, the PAQ and TI/CODAP were rated the highest, except that TI/CODAP was not rated significantly higher than FJA. The CIT was rated as the least practical of the methods in the area of standardization, and the JEM was rated lower than all the other methods except CIT.

Off-the-shelf. The PAQ was rated as most practical in terms of being ready for use "off-the-shelf." The CIT was rated as being least ready for

Table 2
Ratings of Seven Job Analysis Methods for Eleven Practicality Concerns[a]

Practicality Concerns	Job Analysis Methods: Threshold Traits Analysis	Ability Requirements Scales	Position Analysis Questionnaire	Critical Incident Technique	Task Inventory/ CODAP	Functional Job Analysis	Job Elements Method	F[b]	$p <$	η^2
Occupational versatility/suitability	3.74[gh] (1.04)	3.61[g] (1.14)	3.82[gh] (1.09)	3.86[gh] (1.22)	4.13[h] (1.04)	4.06[h] (.94)	3.58[g] (1.12)	3.29	.01	.02
Standardization	3.37[g] (1.01)	3.40[g] (1.18)	4.28[h] (.89)	1.99[j] (.78)	3.97[hi] (1.11)	3.54[gi] (1.02)	2.88 (1.05)	52.03	.0001	.31
Respondent/user acceptability	2.96[g] (.98)	3.00[g] (.98)	3.12[gh] (1.00)	3.19[gh] (1.10)	3.43[h] (1.09)	3.44[h] (.98)	3.16[gh] (1.03)	3.09	.01	.03
Amount of job analyst training required[c]	2.73[gh] (1.07)	3.00[g] (1.01)	2.78[gh] (1.04)	3.04[g] (1.08)	2.39[h] (1.21)	2.57[gh] (1.04)	2.68[gh] (1.06)	2.60	.05	.02
Operational	2.96[g] (1.09)	3.09[gh] (1.01)	4.20[i] (1.01)	3.42[hj] (1.26)	4.04[i] (1.12)	3.85[ik] (.95)	3.52[jk] (1.08)	20.59	.0001	.14
Sample size[d]	2.78[gh] (.84)	2.51[gi] (.98)	3.53[j] (1.15)	3.04[hk] (1.26)	2.08[i] (1.21)	3.26[jk] (.86)	3.16[hjk] (.92)	18.02	.0001	.13
Off-the-shelf	3.20[g] (1.17)	3.27[g] (1.23)	4.51[h] (.93)	2.43 (1.33)	2.98[g] (1.36)	3.28[g] (1.29)	3.03[g] (1.28)	28.58	.0001	.19
Reliability	3.04[g] (.93)	3.10[g] (.85)	3.84[h] (.86)	2.67[i] (.95)	4.05[h] (.80)	3.49 (.88)	2.93[gi] (.88)	27.68	.0001	.18
Cost[e]	2.87[g] (.87)	3.23[h] (.90)	3.29[h] (1.15)	2.57[gi] (1.00)	2.29[i] (.96)	2.80[g] (.84)	2.96[gh] (1.07)	14.54	.0001	.11
Quality of outcome	2.67[g] (.86)	2.61[g] (.82)	3.17[h] (.99)	2.74[g] (1.00)	3.63[i] (1.07)	3.53[hi] (1.02)	2.76[g] (1.04)	17.54	.0001	.13
Time to completion[f]	3.31[gh] (.95)	3.36[g] (1.03)	3.43[g] (1.07)	2.17[ij] (.97)	1.93[i] (1.11)	2.57[jk] (.90)	2.93[hk] (1.05)	42.70	.0001	.25

[a]Means are the top numbers. Standard deviations are the numbers in parentheses. The sample size ranges from 88 to 92.

[b]F-ratios, probability, and η^2 values are for the effect of job analysis method, as derived from a two-way repeated measures ANOVA (job analysis method × organizational affiliation).

[c]The higher the rating the less training required.

[d]The higher the rating the fewer respondents required.

[e]The higher the rating the lower the cost.

[f]The higher the rating the less time required for completion.

[ghijk]Means in each row with the same superscripts are not significantly different from each other.

use "off-the-shelf." All five of the other methods were rated about the same. In addition, the 2-way analysis of variance showed a significant job analysis method × organizational affiliation interaction effect for ratings on this area of practicality, $F(18, 504) = 1.89, p < .05$. In this area of practicality, the private sector respondents tended to rate FJA and TI/CODAP higher than did public sector respondents. Academic and miscellaneous sector respondents tended to rate the TTA higher than did other respondents, and the ARS higher than public sector respondents.

Reliability. TI/CODAP and the PAQ were rated significantly higher in reliability than were the other job analysis methods. Although FJA was rated significantly lower in reliability than TI/CODAP and the PAQ, it was rated significantly higher than the four remaining methods. The CIT was rated significantly lower in reliability than all the job analysis methods except the JEM.

Time to completion. PAQ, ARS, and TTA job analysis studies were rated as taking less calendar time to complete than comparable job analysis studies using other methods, although the ratings for the TTA were not significantly different from those for the JEM. TI/CODAP studies were rated as requiring the most time for completion, although TI/CODAP ratings were not significantly different from CIT ratings in this regard. A significant job analysis method × organizational affiliation interaction effect for time to completion ratings was also found, $F(18, 516) = 2.34, p < .01$. In this area of practicality, the academic sector respondents tended to rate TTA and ARS as taking less time for completion than did the private sector respondents. The miscellaneous sector respondents tended to rate the PAQ as taking less time to complete and the CIT as taking more time for completion then did the public and private sector respondents. The private sector respondents tended to rate TI/CODAP as taking less time for completion than did the other respondents.

Additional Results. Combinations of job analysis methods generally were preferred over one method alone. Of the 93 respondents, 80 preferred a combination of methods, 9 preferred a single method, and 4 were not sure ($\chi^2 = 116.58, p < .001$). The most frequently chosen combinations of methods included the following: (1) PAQ and TI/CODAP; (2) CIT and FJA; (3) CIT, TI/CODAP, and FJA; (4) PAQ and CIT; and (5) ARS and TI/CODAP. Job analysts who use combinations of methods reported that the advantages of using combinations of methods outweigh the added costs. Of the 74 respondents who reported using combinations of methods, 50 stated that it was worth the added costs, 7 stated that it was not, and 17 were not sure ($\chi^2 = 41.1, p < .001$).

Discussion

It is readily apparent that the results of an opinion survey such as this are not a substitute for careful experimentation. To resolve definitively the issue of relative efficacy among job analysis methods, a programmatic series

of appropriately designed studies will be necessary. Thus this study may be considered only as an interim stage in the continuing effort to accumulate comparative data on job analysis methods.

Unfortunately, opinions about job analysis gathered in this survey are not attributable directly to particular features of a job analysis method. A more effective "hybrid" or combination method thus cannot be determined by extracting the best features from each of the methods evaluated in this study.

Still another problem with the study is that of sampling error, which may curtail the generalizability of these data. Because there was no well-defined population of job analysis experts from which to sample, the purposive sampling strategy may have yielded a nonrepresentative group of respondents. The extent of this problem cannot be assessed adequately, although the opportunity to participate in the survey was widely advertised. Moreover, respondents were widely dispersed geographically, affiliated with a variety of organizations, and engaged in a diversity of human resource activities. Although a number of recognized authorities are included in our sample, none of the developers of the job analysis methods considered in this survey were invited to serve as respondents. Therefore, there are grounds for assuming that the ratings were not overly affected by preexisting biases due to vested interest in a particular method.

On the other hand, the 93 experienced job analysts who participated in the survey apparently attended to their rating tasks quite well. That is, their evaluative responses evidently were based on the descriptions of the job analysis methods that were provided as part of the survey package, in addition to their previous experiences doing job analysis studies. This conclusion is based on the relatively low impact on ratings of the variables sex of respondent, familiarity with a job analysis method, and organizational affiliation.

This study found that job analysis methods are perceived as differentially effective for various human resource purposes, and as differentially practical. Although the amount of variance explained in the ratings by job analysis methods is not large, neither is it inconsequential. Nevertheless, these data should not replace a manager's, consultant's, or a researcher's judgment about which methods to use. They will be closely familiar with the vagaries of particular situations. However, their choices may be aided considerably by having at their disposal the pooled judgments of a large number of job analysis experts. When multiple job analysis methods are used, a strategy that is endorsed overwhelmingly by the respondents, the increased costs of the job analysis are more likely to pay off in superior outcomes with the aid of these results.

The findings here may serve as a source of hypotheses to be tested in future controlled, experimental studies. For example, it could be hypothesized that the primary difference in the relative efficacy of job analysis methods is due to the type of job descriptor or unit of analysis (e.g., tasks, activities, threshold traits) they employ. It also might be surmised that the

data gathering approach used within a method (e.g., structured questionnaire, brainstorming meetings) is of secondary importance, although a significant factor nonetheless. Future research on these variables may lead to the synthesis of that "ideal" method, which is beyond reach at the present stage of knowledge. Perhaps that ideal method will overcome some of the limitations of current job analysis technology; namely, its relative inability to deal with the job as it should be, rather than how it is now, and with changes in the job over time.

Furthermore, the results provide some guidance to the developers of those job analysis methods included in this study so that they may be modified to serve user needs more adequately. In addition, the path to comparing combinations of methods has been cleared to some degree, so that future research on suitable combinations of methods may be facilitated. No other studies are known to have addressed the efficacy of combinations of methods.

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SEX DIFFERENCES IN JOB SATISFACTION REVISITED[1]

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Although sex differences in job satisfaction have received attention in the recent literature, research findings are somewhat unclear. For example, some studies report that women are more satisfied with pay (Ronan & Organt, 1973; Sauser & York, 1978), but other studies have found no sex differences in any Job Description Index (JDI) scales (Busch & Bush, 1978) or on a single measure of overall job satisfaction (Fry & Greenfield, 1980). Also, although there may be some tendency for men and women to differ in pay satisfaction, questions concerning what processes underlie dissatisfaction for either gender and where in the organization these processes are likely to occur remain uninvestigated. It is assumed here that men and women are most likely to differ in satisfaction with organizational rewards—namely, pay and promotion—and that these differences will be moderated by occupational level.

Wages and promotional opportunities are work factors that organizations control directly through policy and procedure. At lower occupational levels the relationship between a worker, his/her organization, and pay or promotion is somewhat standard, with initial hourly wages set and time periods between raises somewhat fixed. At higher levels, however, the criteria for advancement are not as concrete, and salaries can vary considerably within the same job position. Consequently, the lack of formal rules concerning the allocation of pay and advancement opportunities at higher occupational levels could promote greater variability in individual perceptions

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of fair or just treatment. Along these lines, Polk (1974) suggested that organizations are structured to maintain females in positions of low status and power vis-à-vis males. This hypothesis implies that women may perceive themselves as being treated unfairly in comparison to their male colleagues, particularly at upper organization levels. A recent study by Shapiro and Stern (1975) could be viewed as support for this hypothesis. The researchers here found sex differences in pay satisfaction, with females in professional groups (clinicians and social workers) less satisfied and females in nonprofessional groups (factory workers) more satisfied. Although the authors did not report actual income or test for statistical significance, the results do suggest that sex differences in pay satisfaction may interact with type of work group. To extend this idea, the present research was designed to examine sex differences in job satisfaction at high and low occupational levels. Based on previous considerations, a significant occupational level × sex interaction was predicted for pay and promotion satisfaction.

Method

Participants. The sample consisted of 200 males and 192 females who received a questionnaire at their home five years after college graduation and reported full time employment at the same job for at least one year. More than 300 business and government organizations were represented. All participants graduated from the same college in the same year and were approximately the same age. In the postcollege questionnaire, individuals reported how many jobs they had held since graduation and indicated on a 5-point scale how qualified they perceived themselves for their present job. Statistical analyses (F-tests) revealed no significant differences among men and women at high or low occupational levels for number of previous jobs or perceived qualifications. The response rate to this questionnaire was 66 percent. A follow-up study comparing respondents to nonrespondents found no systematic differences between groups (Jackson, 1978).

Measures. The independent and dependent variables were taken from a multipurpose 79-item questionnaire relevant to life history after college. Items were multiple choice in format, and responses were scored on a continuum.

Participants responded to questions of "how important," "how much," and "how often," using four- and five-category response scales appropriate to each question. The items were subjected to a principal components factor analysis which yielded several dimensions. One resulting factor—occupational level—is presented in Table 1. The nature of the item loadings on this factor intuitively seemed related to occupational level. For instance, managing and organizing are more common in upper level than in lower level jobs. To test the accuracy of the occupational level factor, three judges independently classified 16 job titles. There was 100 percent agreement among judges, with eight titles classified as high level (i.e., marketing

Table 1
Items and Factor Loadings for Occupational Level Factor

Item	*Factor Loading*
On your job, how often do you manage/supervise?	.631
On your job, how often do you organize/plan?	.545
How important is the opportunity for advancement for you?	.523
How much of your job involves computational work?	.431
How often do you read professional or financial magazines?	.430
How much of your job involves sales activity?	.421
How much of your job involves research activity?	.365
How many salary increases have you had?	.354
Do you have stocks, bonds, and other investments?	.334
On your job, how often do you advise/consult?	.302

manager) and eight as low level (i.e., waitress). A point-biserial correlation between factor scores and this high/low classification for individuals in these 16 jobs was 1. That is, all high level occupations had above average factor scores (range: 521 to 640), and all low level occupations had below average factor scores (range: 249 to 460). Based on these results, a median split procedure was used to place individuals into high and low level occupational groups. This procedure avoided making discrete decisions if job titles were difficult to judge (i.e., social worker) and resulted in the following distribution of high and low level groups: 156 high level males, 75 high level females, 44 low level males, and 117 low level females.

Participants indicated on a 5-point scale how satisfied they were with: (1) salary; (2) opportunity for advancement; (3) company reputation; (4) supervisory relations; (5) co-worker relations; (6) opportunity for discretion; (7) nature of work itself; (8) working conditions; and (9) responsibility on the job. Individuals also reported their monthly income. These responses were used to test predictions and explore alternative explanations for significant results.

Results

Data were analyzed using a 2 (occupational level) × 2 (sex) MANOVA followed by univariate *F*-tests and post hoc tests where appropriate. The MANOVA yielded significant main effects for occupational level (Pillai's Trace = 38.23, $p < .001$) and sex (Pillai's Trace = 11.56, $p < .001$) as well as a significant occupational level × sex interaction (Pillai's Trace = 9.99, $p < .001$).

Hypotheses. Predictions were tested by analyzing separately satisfaction with pay and promotion. There was a significant occupational level main effect [$F(1, 388) = 5.86$, $p < .02$], with the high level group ($M = 3.7$) reporting more satisfaction with wages than the low level group ($M = 3.4$). There was no effect for sex, but the occupational level × sex interaction was significant [$F(1, 388) = 17.79$, $p < .001$]. The means for this interaction, presented in Table 2, reveal greater satisfaction for males in the higher occupational groups, with the pattern reversed at the lower level. The Duncan's

Table 2
Mean Satisfaction and Income Level for Males and Females in Different Occupational Groups

	High Occupational Level		*Low Occupational Level*	
	Males	*Females*	*Males*	*Females*
Pay satisfaction	3.89	3.41	3.11	3.62
Promotion satisfaction	3.86	3.08	3.04	3.12
Monthly income	$1,145	$930	$795	$788

test for differences between the sexes was significant ($p < .01$) for both groups.

For promotion satisfaction, there was a significant occupational level main effect [$F(1, 388) = 8.41, p < .01$] with the upper level group ($M = 3.3$) reporting greater satisfaction than the lower level group ($M = 2.1$). There also was a significant main effect for sex [$F(1, 388) = 6.99, p < .01$] with more satisfaction reported among males ($M = 3.7$) than females ($M = 3.5$). Finally, there was a significant occupational level × sex interaction [$F(1, 388) = 10.20, p < .001$]. The group means presented in Table 2 are similar to those found with pay satisfaction. That is, males reported greater promotion satisfaction at the upper level, and the pattern was reversed at the lower level. In this case, the Duncan's test was significant for the upper level group only ($p < .01$). Taken together, these results support the hypothesis that *occupational level moderates pay and promotion satisfaction among men and women.*

Additional Analyses. To aid in interpreting reports of pay satisfaction, actual income was examined. There were significant main effects for occupational level [$F(1, 388) = 110.83, p < .001$] and sex [$F(1, 388) = 23.45, p < .001$] with higher pay reported by the upper level group (high level $M = \$1{,}075$; low level $M = \$785$), and by males (male $M = \$1{,}067$; female $M = \$840$). The occupational level × sex interaction also was significant [$F(1, 388) = 18.29, p < .001$]. The mean monthly incomes presented in Table 2 indicate that reported satisfaction closely resembled income patterns at the upper level, but not at the lower level. That is, low level women received the least income but reported higher pay satisfaction than low level men.

Given income differences, one might argue that relative comparisons concerning organizational rewards among the four groups underlie differences in reported satisfaction. This idea would be supported if occupational level × sex interactions are limited to pay and promotion. For this reason, satisfaction with company reputation, supervisory and co-worker relations, opportunity for discretion, work conditions, responsibility, and the nature of the work was examined. There were three main effects for these analyses. Males were more satisfied with their opportunity for discretion on the job ($p < .04$) and their working conditions ($p < .04$), and the upper level group was more satisfied with the nature of the work ($p < .01$). There were no significant interactions.

Discussion

The present results support the predictions that sex differences in job satisfaction revolve around organizational rewards and that these differences are moderated by occupational level. It appears that upper level men and lower level women are more satisfied with their pay and promotions. Precisely why lower level women reported relatively high pay satisfaction while receiving the smallest salaries is unclear. It would seem that pay satisfaction is influenced by factors other than absolute income. Perhaps the use of different functional reference groups is an important factor here. Comparison with relevant others is central to determining one's satisfaction level in the theories of distributive justice (Homans, 1961) and equity (Adams, 1965). Although not clearly tested, the data do suggest some type of comparison process underlying the present findings.

Although the sample was somewhat homogeneous with respect to age, education, work experience, and perceptions of job qualifications, it was stratified on income. In this sense, some groups (i.e.,high level females) could be viewed as relatively deprived in comparison to others (i.e., high level males). One original use of the relative deprivation model (Stouffer, Suchman, De Vinney, Star, & Williams, 1949) was to explain reports of satisfaction in the face of real deprivation—the explanation being that some groups have low expectations and maintain themselves as a reference, thus remaining satisfied when actual rewards are few. This may have been the case with low level women. In other words, low level females may appear satisfied with smaller salaries because they make comparisons only within their group, thereby keeping expectations low. One direction for future research might be investigating how high and low level groups make comparisons vis-à-vis their co-workers and the influence of career goals on this process. Is dissatisfaction among low level males a function of unmet expectations? Are upper level women using upper level men, but not lower level women, for relative comparisons? Related to these questions, do the processes underlying pay satisfaction underlie promotion satisfaction as well? The idea of line versus staff positions could be important here. The issue may not be number of promotions but advancement into certain types of jobs (e.g., high paying line positions).

The notion of comparisons among relevant others leading to satisfaction or dissatisfaction is not unique. This study extends previous work in the use of occupational level as a moderator. Results at the lower level reflect a formerly found pattern (Ronan & Organt, 1973). That is, females report greater satisfaction with pay. The use of occupational level, however, reveals an effect left undetected with previous research design. By failing to include occupational level, past researchers missed a disordinal interaction between sex and organizational level for pay as well as for promotion satisfaction. In sum, the present study focuses on the importance of looking beyond simple main effects when examining sex differences in satisfaction

and suggests a social comparison framework for guiding future research in the area.

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A TEST OF THE SOCIAL ISOLATION OF MALE TOKENS[1]

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Over the past 10 years considerable journal space has been devoted to the presence of minorities in the workplace, specifically the problems that

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women managers face. Studies have shown that discrimination surfaces in the areas of pay, promotion, performance evaluation, task assignment, recruitment, and co-worker relationships (Day & Stogdill, 1972; Hagen & Kahn, 1975; Kanter, 1977; Patterson, 1975; Rosen & Jerdee, 1974; Spangler, Gordon, & Pipkin, 1978; Terborg, 1977; Terborg & Ilgen, 1975).

In a recent review of women in management, Terborg (1977) cautioned against concluding the existence of sex effects when extant differences really may be due to factors that covary with sex. Although Terborg was referring to a variety of situational variables, Kanter (1977) made a similar point regarding intermediate level structural variables such as sex ratios. Kanter argued that it is the numerical scarcity and rarity of women in management rather than femaleness per se that shapes their interactional environment. Once the ratio of males to females becomes more balanced, individuals are treated less as symbols, or "tokens," and more as individuals.

Although Kanter's proportional hypothesis emerged from observations of women in sales, she generalized her findings to any group that should find itself in the minority. On the surface, this assertion appears reasonable. The two most common minorities found and researched in organizations are blacks and women. In terms of status and power, their relationships to the white male majority are essentially the same: the sex- and race-based hierarchy of the larger society favors white males, as does the immediate, numerically derived organizational environment. The status configuration changes, however, when a male becomes a token among females. In this case, the numerically derived organizational environment would favor females, and the sex based hierarchy of the larger society would continue to favor males.

For this reason, Kanter termed males "high status tokens." She argued that deferential treatment may be substituted for patronizing behavior but the outcomes she associated with tokenism should still obtain (Kanter, 1977). Those outcomes are boundary heightening and social isolation of the token, entrapment in stereotyped roles that force tokens to distort their self-image (although the distortion may occur in favorable rather than unfavorable ways for high status tokens), and increased pressure to perform. Thus, although the content of the token-majority exchange may differ for high status tokens, the dynamics of the relationship should remain the same regardless of who is in the token role.

The purpose of this research is to test one of Kanter's hypotheses with male tokens. That hypothesis involves the isolation of tokens by the majority from certain topics of conversation. Those topics usually involve political information (e.g., ways of getting around formal rules, strategies for impressing superiors) and concerns about job performance (Kanter, 1977). The majority's motivation to exclude tokens from topics such as these stems from either a lack of trust in the tokens whom they consider to be outsiders or a desire to see tokens fail because their presence is threatening. By withholding information, majority members preserve their secrets and

make it more difficult for tokens to succeed by slowing down the socialization process.

Previously, social isolation has been linked to such factors as performance and tenure in the organization (Roberts & O'Reilly, 1974), status and leadership structure (Shaw, 1976), and job satisfaction (McLaughlin & Cheatham, 1977). The available tokenism research shows social isolation among female tokens in both work and professional school settings (Kanter, 1977; Spangler et al., 1978; Wolman & Frank, 1975). A few articles examine the male nurse in the token role (Greenberg & Levine, 1971; Schoenmaker & Radosevich, 1976; Segal, 1962), but no data based research could be found regarding the social isolation of male tokens. Consequently, this study will examine the social isolation hypothesis for male tokens:

Hypothesis: Male tokens should be more socially isolated than their numerically dominant female colleagues from discussions of political information (e.g., ways of getting around formal rules, strategies for impressing superiors) and personal information that could affect performance.

Method

Sample. Subjects included 322 nursing students, 41 males and 281 females. The average age was 22.5 for the males and 22.4 for the females. The sample was Caucasian with the exception of a small percentage of the females. Subjects were drawn from two midwestern nursing schools.

Due to the very large number of females and a very small number of males ($N<30$) in any one nursing school, pooling of two schools and classes within schools was required for statistical comparison. Because tenure in the organization could influence certain responses, the effects of year in school also were explored.

Several nursing schools were examined. The two selected schools were similar along the following criteria: (1) type of program (both were diploma schools), (2) length of program (2 years), (3) distribution of ages in the student body, (4) number of males in the program (all fell into Kanter's token category), (5) degree of autonomy provided to students, (6) admission standards, and (7) relative competitiveness existing in the environment (both had a strong emphasis on grades, class honors, and clinical performance).

Procedures. A questionnaire was administered in large group settings (one for each class). The response rates to the questionnaires were 88 percent, 90 percent, 94 percent, and 98 percent for the four classes. All questionnaires were usable.

The measurement of social isolation called for the construction of a sociometric instrument. An instrument was constructed and pretested on a freshman class ($N=97$) at a third midwestern nursing school. After modifications suggested through pretesting, a revised questionnaire was administered to the four nursing classes in the sample. Students were given a list of the other students in their class and asked to respond to the following:

(1) Who do you get information from regarding the politics of being a student (i.e., how to get around formal rules, strategies for impressing superiors, overall strategies for getting what you want)? (2) Who do you give information to regarding the politics of being a student? In addition to identifying the direction of influence, students weighted their responses by specifying both the frequency and importance of the contacts. (Students provided a raw score to determine frequency of contact per day, and they evaluated importance on a 1 to 5 scale. Frequency then was multipled by importance, and this served to weight the linkage.) Similar sociometric questions were posed regarding three other topics: personal problems that could affect performance at school, general school information, and social information. Although unnamed by Kanter, these last two topics were studied because knowledge of such information is thought to be important and access to that information by tokens has yet to be tested.

Even though student A could report getting information from student B, there is no guarantee that student B would reciprocate and report giving information to A. This was treated as a response error. Thus reciprocation was forced for unreciprocated links. It is important to note that reciprocation preserves the directionality of the information flow. In other words, if A gets information from B, reciprocation forces only B gives information to A, not A gives information to B, or B gets information from A.

The two indicators of social isolation employed in this study have been used in other recent investigations (Moch, 1980; O'Reilly & Roberts, 1977). Both indicators are outputs from a network analysis procedure developed by Richards (1975) which provides individual, group, and system-wide information. The first indicator of social isolation, at the group level of analysis, is the role assigned to each individual on the basis of his/her position within the networks. Richards' algorithm distinguished among: (1) isolates, those who have no links or only one other link to persons who are themselves isolated; (2) dyad members, those who are linked to only one other person and in terms of the group function they are considered as isolated pairs; and (3) group members, those individuals belonging to a group that meets the following criteria: (a) there must be at least three members, (b) members must have 50 percent of their contacts with members in the group, (c) each member must be linked to every other member within the group (through a path lying entirely within the group), (d) there must be no single individual or link that, when removed, causes the group to fail to meet the above criteria; (4) liaisons, individuals who are linked to two or more groups but do not meet the criteria for group membership themselves; and (5) others, those persons who possess a number of links to other persons but fail to qualify for membership in any identifiable group.

The first indicator of social isolation then followed Richards' definition of an isolate. If an individual was classified as a liaison, an other, or a group member, that person was considered integrated into a network of work relations. Dyad members were analyzed separately because members themselves are not isolates; however, as a pair they function as one.

The second indicator of social isolation, at the individual level of analysis, is an integrativeness score that is a measure of association of a subject's immediate contacts. An integrativeness score was calculated as the number of links between persons connected to the focal person divided by the largest possible number of such links. The values range from 0 to 1. Eight integrativeness scores, one for each network topic, were tabulated for each individual.

Results

Role Designation. Separate network analyses were performed on each class. The first indicator of social isolation involves the role assignment based on the group structures that emerged. Table 1 presents the percentage of males and females falling into each role classification. Although there were two separate networks for each topic, the results were so similar that the percentages were averaged for each topic. An examination of the isolate category in Table 1 shows an extremely low percentage of both males and females playing the isolate role in all four networks. There are no isolates in the school information network for either sex. For males there are no isolates in the politics or social networks. For females there is less than 1 percent in the politics and social networks. The personal problems network is the only network in which any isolates exist at all for both sexes, although the percentages still are extremely low. No dyad members, who as pairs function as isolates, surfaced.

Table 1
Network Role Classification

Network		*Group Member* %	*Liaison* %	*Isolate* %	*Dyad Member* %	*Other* %
Politics	Males	68.3	3.7	.0	.0	28.1
	Females	69.6	1.1	.5	.0	28.7
Personal problems	Males	47.6	2.5	3.6	.0	46.4
	Females	69.6	3.4	2.3	.0	24.5
School information	Males	91.5	2.4	.0	.0	6.1
	Females	80.8	2.3	.0	.0	16.9
Social information	Males	84.2	6.1	.0	.0	9.8
	Females	74.6	4.5	.8	.0	20.3
Combined	Males	72.9	3.7	.9	.0	22.6
	Females	73.7	2.8	.9	.0	22.6

Integrativeness Scores. The second indicator of social isolation involves subjects' integrativeness scores for the eight networks assessed. The eight integrativeness scores for each person were subjected to a principal components analysis with iterations in order to arrive at a more parsimonious set of network variables. Variables that loaded .50 or above on one factor with no secondary loading greater than .30 on another were retained. The analysis produced a two factor solution as shown in Table 2. It is immediately

Table 2
Principal Components Analysis with Iterations

	Factor 1	*Factor 2*
School information; gets information from	.88	.14
School information; gives information to	.89	.18
Social information; gets information from	.67	.42
Social information; gives information to	.64	.45
Political information; gets information from	.78	.21
Political information; gives information to	.77	.24
Personal problems; gets information from	.23	.93
Personal problems; gives information to	.22	.87
% of Variance	62.4	16.6

apparent that the directional information for the different topics (i.e., who do you get information from, give information to?) is strongly correlated, which suggests a mutual exchange of information. The factor matrix in Table 2 shows that general school information, social information, and political information correlate strongly with the first factor, although social information also has high loadings on the second factor. The general nature of this topic is thought to be the reason for the dual factor loadings. To aid in interpretation, "get information from" and "give information to" on social matters were dropped from the analysis. The first factor then is composed of the topics "school information" and "political information," both of which involve work knowledge. The second factor is composed solely of the topic "personal problems affecting performance." Composite scales for these two factors were formed by adding together the variables that loaded on that factor. This procedure resulted in sacrificing the orthogonality of the factors.

The two factored network variables are the dependent variables in a model that tests for sex and year in school differences. Because the correlation between the dependent network variables was .43, multivariate analyses of the data were employed. Thus, the model tested here is a 2-way multivariate analysis of variance. The multivariate profile analysis (Morrison, 1976), which tested for an overall treatment effect, was significant [$F(1, 169) = 18.67$, $p < .0001$]. The multivariate analyses of variance that followed tested the model for specific treatment effects. The effect for sex was not significant [$F(2, 189) = .24$, $p < .79$]. The effect for year in school was significant [$F(2, 189) = 3.50$, $p < .03$]. The interaction effect for sex and year was not significant [$F(2, 189) = .61$, $p < .55$].

Univariate F tests were used subsequently to probe the meaning of the multivariate difference (Spector, 1977). A SAS (Helwig & Council, 1979) Type IV sums of squares solution was employed in all cases because the design was unbalanced and the effects were not orthogonal. This solution partials for all other effects in the model, which is the most conservative approach. The overall F was significant for the work knowledge network [$F(3, 190) = 8.45$, $p < .001$, $R^2 = .12$], with a year effect surfacing

[$F(3, 190) = 5.57$, $p < .02$]. The overall F was not significant for the personal problems network [$F(3, 190) = .17$, $p < .91$, $R^2 = .003$].

Sex Composition of Group and Individual Contact Networks. Because a sex effect failed to surface for both indicators of social isolation, specifically the role classification and the integrativeness scores, a separate analysis of the sex composition of both the group structures that emerged as well as the contacts named by each student was undertaken. The logic of this inquiry stemmed from the belief that if males primarily associate with other males, this still would be evidence of social isolation; thus the above finding would be a spurious one.

There were 76 groups that emerged from the four networks. Although there probably is considerable overlap among groups because the networks are not independent of one another, only one group contained males only. There were 30 overlapping groups containing only females (which is due partly to the vast majority of students being female) and 45 overlapping groups containing both sexes.

When individual data were examined for the percentage of males and females named as contacts, little evidence of exclusive contact with males was found. Of the contacts named by males in the different networks, 27 percent to 33 percent were other males. Of the contacts named by females, 9 percent to 13 percent were males. Although males named other males more frequently than females named males, this finding should not be considered unusual. Males would be expected to associate a little more with other males, especially in the area of personal problems affecting school performance, in which discussion of male-female relationships is likely to surface. Thus, the finding that males are socially integrated does not appear spurious.

Discussion

This research failed to support Kanter's hypothesis that male tokens should be more socially isolated than their numerically dominant female colleagues. Social isolation should have surfaced in discussions involving personal information that could affect school performance as well as political information. One possible explanation for these results could be sex status differences (i.e., the higher status of males and the lower status of females in society's sex hierarchy). According to Acker and Van Houten (1974), a sex based status difference outside of the organization adds to the structuring of control within the organization because organizations tend to reflect the cultures of which they are a part. For the high status male tokens, this translates to a token minority that has a power base from which to resist majority group assertions of control, such as social isolation. For female tokens, in contrast, a lower sex status only augments the numerically derived power of a male majority, leaving the former with an even greater power deficiency. The implications of this argument suggest that being numerically dominant is only one among many sources of status and control

within the organization, and these sources must be considered when examining token dynamics. Future research should attempt to confirm the extent to which token dynamics intensify when other sources of status and control favor the majority and lessen when such sources favor the token minority. (See also Fairhurst and Snavely, 1983.)

A second explanation comes from Cook's (1969) work on race relations. Organizations go through stages with regard to the integration of any specific minority group. These stages are marked by the degree of contact with the minority. Fromkin (1974) makes the point that proportional imbalance may be most critical in the early stages of integration rather than later on. If the women, as a minority group, in Kanter's study were newer to their setting than this study's male nursing students were to theirs, this may explain why social isolation surfaced for the former. Future research should attempt to control for the newness of a token minority to a setting as well as examine the integration histories of several organizations.

Although a sex effect failed to surface in either of the two network variables, year in school was found to be related to the work knowledge network factor. An examination of the means showed upperclassmen to be more integrated than lowerclassmen. This result is understandable in light of the longer time upperclassmen have had to familiarize themselves with the environment and to establish contacts.

Finally, this study, which was part of a larger project examining token dynamics in general, was limited to testing the social isolation of make tokens in a nursing school environment. Two other token dynamics, role entrapment and performance pressure, should be explored in future research. Additionally, future efforts should examine males in other token positions (e.g., child care, clerical positions) to discover what is common to the male token role and what is unique about the nursing school environment. More research is necessary to understand sex effects as well as other status differential effects on token dynamics, but this study indicates that numerical imbalance alone neither inspires nor explains the social isolation found in tokenism.

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R&D WORK CLIMATE AND INNOVATION IN SEMICONDUCTORS

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As a result of the rapid advances in semiconductors, technological innovation has become a key concept in intercorporate competition and survival. Research and development (R&D) subsystems have been established with the primary responsibility of undertaking research and developing new technological innovations for the market place. There has been a high commitment of both physical and financial resources to the development of innovative products and processes.

Organizational researchers in the past two decades have devoted considerable effort to the understanding of the dynamics of innovation. Over 2,400 studies have been published concerning the topic of innovation (Rogers & Eveland, 1975). One of the most popular studies in the literature has been on the correlates of innovation. These have included size (Aiken & Hage, 1971; Baldridge & Burnham, 1975; Mohr, 1969), decentralization (Aiken & Hage, 1971; Evan & Black, 1967; Palumbo, 1969), autonomy (Carroll, 1967; Paolillo & Brown, 1978; Sapolsky, 1967; Vegso, 1976), and structure (Aiken & Hage, 1971; Baldridge & Burnham, 1975; Paolillo & Brown, 1978). The results often have been inconsistent. As Downs and Mohr (1976) noted, factors found to be important for innovation in one study are found to be considerably less important, not important at all, or even inversely important in another study. One possible explanation for the inconsistent results could be the tendency of researchers to use the entire organization as the unit of analysis instead of the specific subsystem from which innovations are generated.

Work climate is defined as a relatively enduring quality of an organization's internal environment that results from the behavior and policies of members of the organization, especially in top management. The work climate is perceived by members of the organization; serves as a basis for interpreting the situation; and acts as a source of pressure for directing activity (Pritchard & Karasick, 1973). Attempts at assessing the relation of work climate to innovation have been limited to very few dimensions, such as communication (Aiken & Hage, 1971; Bigoness & Perreault, 1981; Paolillo & Brown, 1978), reward and structure (Paolillo & Brown, 1978), and achievement orientation (Litwin & Stringer, 1968). Vegso (1976) attempted an examination of the relation of work climate to innovation but fell short of the desired intention by limiting his study to only three dimensions of climate. There is a scarcity of information about the relation of a comprehensive definition of work climate to innovation.

The present study examines the relationship between work climate and innovation in the R&D subsystem of semiconductor companies. The innovativeness of semiconductor R&D subsystems was considered with respect to the initiation, adoption, and implementation phases of innovation during the period 1970-1980. The reference domain was the U.S. semiconductor industry. The content domain was an agreed list of technological innovations (Bigoness & Perreault, 1981).

The assumptions underlying this study are:

1. The R&D subsystems of semiconductor companies are the primary initiators of technological innovations and hence the appropriate unit of analysis.
2. The work climate of the R&D subsystem is a relatively enduring quality of the work environment that influences R&D workgroup behavior, attitude, and work performance.

Instrumentation

Innovativeness. A list of innovations in the semiconductor industry from 1970 to 1980 was developed through (a) library research and (b) content validation with two different groups of judges. Materials corresponding to the semiconductor industry (SIC 3674) were intensively reviewed for industry wide innovations since 1970, revealing a total of 32 innovations. A questionnaire was developed to verify that the items on the list exhausted the content domain of interest. The questionnaire was sent to 15 judges selected from Dun and Bradstreet's *Million Dollar Directory* (1979). All the judges occupied managerial positions in R&D units in various semiconductor companies and had a minimum educational qualification of a college degree in electronics engineering. Specifically, the judges were asked to:

a. Indicate on a scale of 1-5 (from highly unrelated to highly related) the degree of association of each item with the semiconductor industry.
b. Indicate items on the list that are not considered innovations in the industry.
c. Identify any innovations not on the list that occurred in the industry since 1970.

Of the 15 questionnaires solicited, 10 were received. Six items that, on the average, were rated 1-3 on the scale (i.e., from highly unrelated to neither related nor unrelated) were dropped (interrater reliability was .79). Three items not considered innovations also were dropped (interrater reliability, .87). A further 12 innovations were suggested by the judges and added to the list.

The 23 innovations remaining from the initial 32 plus the 12 suggested innovations formed a third list of innovations. Nine professional R&D managers, who were geographically convenient to the researchers and had a minimum of five years experience in semiconductors, were interviewed and asked to judge item association with the semiconductor industry and item

innovativeness. In addition, they were asked to give the approximate dates of the commercial availability of each innovation.

Six items were rated as neither related nor unrelated to the semiconductor industry (reliability was .91). Four items were judged to be minor improvements in existing technologies rather than innovations (reliability was .96). Three items were considered to be commercially available prior to 1970 (reliability was 1.0). These 13 items were eliminated, and the 22 remaining items formed the innovation index (available on request from the senior author).

Work Climate. The ten dimensions of work climate were those used by Pritchard and Karasick (1973) and developed from an earlier 22 dimensional instrument (Campbell & Pritchard, 1969):

Autonomy. The degree of freedom personnel have in day to day operating decisions such as when to work and how to solve job problems. This includes freedom from constant evaluation and close supervision.

Cooperation. The degree to which personnel either compete with each other or work together and with other people in the organization in the process of getting things done.

Supportiveness. The extent to which the organization tries to satisfy personnel needs for recognition and belongingness over and above traditional methods such as financial compensation and benefits.

Structure. The degree to which the organization specifies the methods used to accomplish tasks; the degree to which the organization likes to specify, codify, and write things down in an explicit form.

Reward System. The degree to which personnel are well rewarded. This includes salary, fringe benefits, and other status symbols.

Performance Reward Dependency. The extent to which rewards are fair and appropriate, and the degree to which these rewards are based on worth, ability, and past performance rather than factors such as luck or whom you know.

Achievement Motivation. This reflects the degree to which the organization or its subsystem attempts to excel.

Status Polarization. The degree to which there are definite physical and psychological distinctions between hierarchical levels within the organization or its subsystems.

Flexibility. Willingness to try new procedures and to experiment with change, so as to improve a situation or process.

Decision Centralization. The extent to which the organization centralizes the responsibility for making decisions as opposed to sharing authority.

Each dimension was represented by a number of items employing a 5-point Likert-type scale ranging from never true to always true. The items were randomized throughout the questionnaire.

Perceived Innovativeness. The perception of the R&D personnel regarding the technological innovativeness of their respective companies was measured by means of a questionnaire based on one developed by Forehand (1963) and Paolillo (1977). It consisted of 10 items concerned with an

organization's: (1) commitment of resources to risky projects; (2) flexibility; (3) ability to change; (4) creativity; (5) opportunities for R&D personnel; (6) use of a wide variety of approaches; (7) willingness to let R&D personnel be autonomous; (8) search for new approaches to problems; (9) budget for R&D; and (10) concern with innovativeness over profit. Respondents rated their organization on a 5-point Likert scale.

Work Climate Stability. This questionnaire assessed a key assumption underlying the work climate measurement, that is, the relative stability or permanency of the nature of the work climate over the period 1970-1980. It consisted of descriptions of the 10 dimensions that comprise the work climate instrument. Respondents were asked to assess change according to 1 = not changed; 2 = has changed somewhat but not to the extent of affecting departmental operations; and 3 = has changed significantly.

Procedure

All R&D managers in 42 companies that listed their activity as exclusively or primarily concerned with semiconductors (SIC 3674) were sent copies of the questionnaires together with a cover letter explaining the purpose of the research. The R&D managers were contacted by phone one week later to solicit their participation. Eight companies representative of the industry in terms of total sales, net income, working capital and number of employees fully participated. A potential 200 respondents in 8 companies were identified, from which 99 responses to the perceived innovativeness and work climate questionnaires were obtained in prepaid return envelopes. Cronbach alpha coefficients for work climate dimensions (Table 1) compared favorably with the original (range .66 to .81) scales. From a possible 51 responses (those with more than 10 years service), 37 were obtained from

Table 1
Rank Order Correlation Between Mean Work Climate Scores and Number of Technological Innovations
($N = 8$)

Work Climate Scales	*Number of Items*	*Reliability (Alpha Estimates)*	*Innovation Process*		
			Initiation	*Adoption*	*Implementation*
Autonomy	9	(.67)	.48	.45	.35
Cooperation	5	(.73)	.20	.23	.38
Supportiveness	5	(.79)	.38	.46	.36
Structure	5	(.56)	.20	.03	−.08
Level of reward	4	(.64)	.60*	.48	.42
Performance-reward dependency	5	(.81)	.81**	.74**	.77**
Achievement motivation	5	(.78)	.55*	.46	.51
Status polarization	5	(.68)	−.36	−.43	−.46
Flexibility	4	(.78)	.67**	.67**	.82**
Decision centralization	5	(.79)	−.36	−.30	−.44
Perceived innovativeness	9	(.88)	.74**	.73**	.70**

*$p < .05$
**$p < .01$

the work climate stability questionnaire. Total respondents per company ranged from 8 to 16.

The heads of the R&D subsystem in the companies were asked to indicate whether their respective companies had initiated, adopted, or implemented each of the 24 innovations (definitions of initiation, adoption, and implementation were given). Guttman scalogram analysis was applied to the 22-item binary innovation index to determine the unidimensionality of the index. A data matrix for the innovation process was developed with the companies as rows and the items of innovations as columns. A value of unity was given to all endorsements and a value of zero to all nonendorsements. A triangular pattern of responses was obtained, implying a systematic progression of endorsements. The general biserial correlation coefficients are relatively high (19 out of 22 greater than .50), indicating that the items discriminate well between high and low innovative companies (Levy & Pugh, 1969). This permits the number of innovations endorsed in each stage of the innovation by each company to be used as a cumulative score for initiation, adoption, and implementation. There was an average of two fewer adoptions than initiations and an average of two fewer implementations than adoptions per company. Those companies initiating few innovations implemented only a small proportion of those few initiations. Those companies initiating many innovations implemented nearly all of them. High initiation is significantly related to high implementation (Dickson, Abbey, & Fordemwalt, 1982).

Results and Discussion

Average respondent perceptions of work climate by company were computed, and each of the work climate dimensions was rank ordered among the eight companies. The number of innovations by company was used similarly to rank order the companies. The Spearman rank order correlations show that performance reward dependency and flexibility are significantly related to the number of innovations for all stages of innovation (Table 1). This suggests that the work climate of innovative R&D subsystems is characterized, first, by a reward system that recognizes and equitably rewards excellent performance and, second, by a willingness to take risks and experiment with innovative ideas and proposals.

Perceived innovativeness was significantly related to all stages of innovation. This suggests that creative technical leadership and independence among R&D personnel are the keys to success in the semiconductor industry (Burns & Stalker, 1961).

Level of reward and achievement motivation are significantly related to the initiation of innovation only. Motivation is more of an individual phenomenon, and it might be expected to relate more to the individual stage of innovation (initiation) and less to the group (adoption) and organization (implementation) stages. The nine R&D managers interviewed perceived

initiation as an individual activity. Level of reward might impact individual motivation more than group or organizational motivation.

The range of work climate stability was from 1.39 to 2.17, indicating that no one company's climate had changed significantly over the period 1970 to 1980. The rank order correlation between the number of technological innovations and company work climate stability means was not significant ($r = .40$; $p > .05$; $N = 8$).

A longitudinal study is needed to determine the effect of climate on innovation. In this study the data were collected in the reverse sequence, that is, the *present* climate data are correlated with *past* innovations. This study employs only companies that have survived. There may be a number of companies that did not innovate and hence did not survive. This restricts the ranges of innovation and climate variables and makes generalization to the overall industry difficult.

Zaltman, Duncan, and Holbeck (1973) noted that an organization must shift its structure as it moves through the various stages of the innovation process. Various configurations of climate dimensions may differentially influence the stages of the innovation process. The identification of such climate dimensions that influence each stage of the innovation process in essence would enable precise design strategies to be adopted to facilitate innovative activity in the R&D subsystem. The results here suggest that although the climate is related to the number of innovations, it does not differentially affect the initiation, adoption, and implementation stages. This may be because innovations are a continuous organizational activity in the semiconductor industry.

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A MEASURE OF STYLES OF HANDLING INTERPERSONAL CONFLICT[1]

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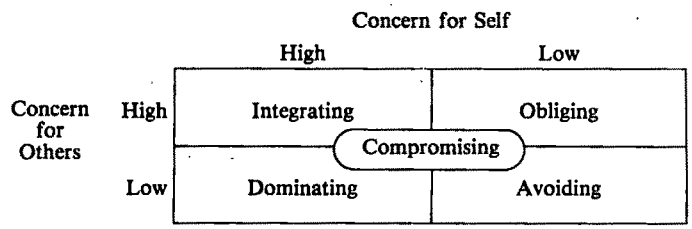
Blake and Mouton (1964) first presented a conceptual scheme for classifying the modes (styles) for handling interpersonal conflicts into five types: problem-solving, smoothing, forcing, withdrawal, and sharing. Their scheme was reinterpreted by Thomas (1976).

In the present research a conceptualization similar to that of Blake and Mouton and Thomas was used to differentiate styles of handling interpersonal conflict on two basic dimensions: concern for self and for others.

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The first dimension explains the degree (high or low) to which a person attempts to satisfy his/her own concern. The second dimension explains the degree (high or low) to which a person wants to satisfy the concern of others (Rahim & Bonoma, 1979). A combination of the two dimensions results in five specific styles of handling interpersonal conflict as shown in Figure 1.

Figure 1
The Styles of Handling Interpersonal Conflict



Four instruments currently are available for measuring the modes. These were designed by Blake and Mouton (1964), Hall (1969), Lawrence and Lorsch (1967), and Thomas and Kilmann (1974). Thomas and Kilmann's study with 86 MBA students concluded that the "overall reliability coefficients for the four instruments fall within the low-to-moderate range" (1978, p. 1142). The Thomas-Kilmann and Hall instruments showed somewhat higher reliabilities and some degree of convergent validity for all the five modes of handling conflict.

The study by Thomas and Kilmann (1978), which used a small and nonrandom sample of students to test the reliability and validity of the four instruments, has several limitations. First, generalizing results from a nonrandom sample of college students to a more experienced, older, and much less educated general population is questionable (Robinson, Athanasion, & Head, 1969). Second, tests of the reliability and validity of an instrument require large, not small samples.

Although factor analysis probably is the most powerful method of construct validiation (Kerlinger, 1973), the four instruments did not provide evidence for the factorial independence of the five scales of conflict modes. Factor analysis of Lawrence-Lorsch conflict items, for example, resulted in three instead of five factors. A study by Fry, Kidron, Osborn, and Trafton (1980) cast serious doubts on the construct validity of the Lawrence and Lorsch questionnaire.

The Study

The objective of this study was to construct factorially independent scales to measure the five styles of handling conflict, as presented in Figure 1, and to provide evidence of their reliability and validity. The factors that

affect the styles of handling conflict with superiors, subordinates, and peers have not been thoroughly studied. In this study the empirical validity of the scales were tested against measures of role status and sex.

Role Status. In superior-subordinate communication, subordinates frequently say what is acceptable rather than what they know is true. Therefore, an individual may use a more obliging style with superiors than with a subordinate or peer. Because subordinates are likely to withdraw from a conflict situation (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964), it is expected that individuals will more likely use the avoiding style with superiors than with peers, and more with peers than subordinates. A study by Phillips and Cheston (1979) reported that a forcing approach is more common in handling differences with subordinates than with peers and much less common with superiors. Finally, a compromising approach is expected when both parties in a conflict situation have equal power (peers).

Sex. There is evidence that males are more dominating and less compromising than females in conflict situations (Imler, 1980; Kilmann & Thomas, 1977). Therefore sex was employed for validation purposes.

Method

Seven nonrandom samples were used to generate and select suitable items for the measurement of conflict styles. From a national sample, five factorially independent and reliable scales for conflict styles were constructed and used to test further validities of these scales against the measures of role status and sex. Also used were two convenience samples to test the scales' repeat reliability and to check whether the scales were free from social desirability and response distortion bias.

Instrument Development. The Rahim Organizational Conflict Inventory–II (ROCI-II, Rahim, 1983a) was designed on the basis of lengthy and repeated feedback from the subjects and factor analyses of various sets of items. Each item was cast on a 5-point Likert scale (a higher value represented greater use of a conflict style). This was filled out by MBA and undergraduate students ($N=60$) and managers ($N=38$). After the subjects filled out the questionnaire, an item-by-item discussion was initiated by the researcher. The items that were reported to be difficult, ambiguous, or inconsistent were either replaced or revised.

The data from successive administrations of the instrument were factor analyzed (*N*s: students = 184, 351, 133; teachers and principals = 380; hospital management personnel = 185). After each factor analysis, the items that loaded $<.40$ and/or loaded on an uninterpretable factor were discarded or rewritten. About 105 items were considered for inclusion in the instrument. On the basis of the above procedures a final instrument was prepared, which contained 35 items, 7 items for measuring each style of handling conflict. The order of items was randomized.

The ROCI-II contains three separate forms—A, B, and C—differing only in reference to conflict with a boss, subordinate, or peer, respectively.

The ROCI-II also solicits information such as tenure, sex, functional areas, organizational level, and education.

National Sample. About an equal number of Forms A, B, and C of ROCI-II were sent to 4,000 executives randomly selected from the Penton/IPC list of 1.3 million executives. These executives represented 25 different industries. A cover letter explaining the purpose of the study accompanied the instrument. Usable responses were received from 1,219 executives, a response rate of about 31 percent.

The respondents represented top ($N=176$), middle ($N=501$), and lower ($N=515$) organizational levels (excluding 27 nonrespondents), more than eight functional areas, and different levels of educational attainment, such as high school ($N=145$), 2-year college ($N=233$), bachelor's degree ($N=572$), master's degree ($N=202$), and other (including 3 nonrespondents) ($N=67$). There were 50 female respondents. Average tenure of the top, middle, and lower level executives was more than 22, 18, and 17 years, respectively.

Analysis and Results

Construct Validity. Responses to the 35 conflict items from the national sample of 1,219 executives were factor analyzed, using principal factoring with iteration and varimax rotation. The analysis extracted eight factors with eigenvalues ≥ 1.00 (Rahim, 1979). The first five factors were consistent with a priori expectations. Retained in the final instrument were 28 items with factor loadings $\geq .40$. Factor loadings for the selected items are underlined in Table 1.

Table 1
Factor Structure Matrix for Varimax Rotated Factor Solution ($N=1,219$)

Item No.	Items	Factors[a] IN I	AV II	DO III	OB IV	CO V
01.	I try to investigate an issue with my ____[b] to find a solution acceptable to us	.53	-.02	-.05	.01	.09
04.	I try to integrate my ideas with those of my ____ to come up with a decision jointly	.55	.02	-.08	.04	.20
06.	I try to work with my ____ to find solutions to a problem which satisfy our expectations	.56	.01	-.07	.08	.07
15.	I exchange accurate information with my ____ to solve a problem together	.61	-.07	-.01	.10	.01
28.	I try to bring all our concerns out in the open so that the issues can be resolved in the best possible way	.58	-.12	-.00	-.06	.01
29.	I collaborate with my ____ to come up with decisions acceptable to us	.49	-.05	.04	.14	.11
35.	I try to work with my ____ for a proper understanding of a problem	.60	-.02	-.01	.03	.03

[a]IN = integrating; AV = avoiding; DO = dominating; OB = obliging; CO = compromising.
[b]The word boss, subordinates, or peers appeared in each blank space in Forms A, B, and C, respectively.

Table 1 (continued)

Item No.	Items	Factors[a] IN I	AV II	DO III	OB IV	CO V
03.	I attempt to avoid being "put on the spot" and try to keep my conflict with my ____[b] to myself	.05	.60	.06	.07	.12
07.	I usually avoid open discussion of my differences with my ____	-.09	.58	-.04	.03	.03
22.	I try to stay away from disagreement with my ____	-.13	.53	.00	.22	.09
23.	I avoid an encounter with my ____	-.21	.48	-.03	.25	.08
32.	I try to keep my disagreement with my ____ to myself in order to avoid hard feelings	-.05	.61	.04	.12	.03
33.	I try to avoid unpleasant exchanges with my ____	.10	.42	-.00	.16	.06
34.	I generally avoid an argument with my ____	.02	.36	-.11	.16	.08
08.	I usually hold on to my solution to a problem	-.15	.13	.32	.02	-.02
10.	I use my influence to get my ideas accepted	-.00	-.03	.64	.06	.11
11.	I use my authority to make a decision in my favor	-.12	.01	.69	.01	.02
18.	I argue my case with my ____ to show the merits of my position	.07	-.06	.33	.06	.04
24.	I use my expertise to make a decision in my favor	.00	.04	.54	.11	.01
27.	I am generally firm in pursuing my side of the issue	.12	-.06	.44	-.02	-.03
31.	I sometimes use my power to win a competitive situation	-.03	-.03	.64	-.02	.02
02.	I generally try to satisfy the needs of my ____	.19	.12	-.03	.48	.08
12.	I usually accommodate the wishes of my ____	-.02	.11	.11	.68	.18
13.	I give in to the wishes of my ____	-.13	.26	.06	.59	.09
16.	I sometimes help my ____ to make a decision in his favor	.27	.02	.21	.27	-.01
17.	I usually allow concessions to my ____	.02	.11	.07	.42	.14
25.	I often go along with the suggestions of my ____	.14	-.03	-.02	.42	-.03
30.	I try to satisfy the expectations of my ____	.14	.06	.07	.57	.02
05.	I give some to get some	.11	.02	.04	.07	.31
09.	I try to find a middle course to resolve an impasse	.06	.14	.02	.16	.59
14.	I win some and I lose some	.03	-.01	.09	.13	.18
19.	I try to play down our differences to reach a compromise	.08	.22	.06	.08	.39
20.	I usually propose a middle ground for breaking deadlocks	.07	.07	-.00	.06	.82
21.	I negotiate with my ____ so that a compromise can be reached	.14	-.03	.07	.03	.49
26.	I use "give and take" so that a compromise can be made	.14	-.04	-.00	.09	.50
	Eigenvalue	4.10	3.00	2.26	1.52	1.09
	Percent of variance explained	30.5	22.4	16.9	11.4	8.2
	Cumulative percent of variance	30.5	52.9	69.8	81.2	89.3

[a] IN = integrating; AV = avoiding; DO = dominating; OB = obliging; CO = compromising.
[b] The word boss, subordinates, or peers appeared in each blank space in Forms A, B, and C, respectively.

The selected factors represent the five independent dimensions of conflict styles and were named integrating, avoiding, dominating, obliging, and compromising styles, respectively. In order to test the stability of the five factors in different subsamples, the data from the first batch of 609

questionnaires, the remaining batch of 610 questionnaires, and Forms A, B, and C, were factor analyzed separately. In each of the five cases, the factor structure was very similar to the one shown in Table 1. Other orthogonal rotation methods (e.g., quartimax, equimax, and oblique) yielded five interpretable factors consistent with the factors shown in Table 1.

Five scale scores were constructed by adding item responses in a factor and dividing by the number of items. The intercorrelations among the five scales ranged between −.03 and .33 (Rahim, 1983b).

Reliability. Reliability estimates for the five scales of conflict styles and Pearson's correlations between these five scales and SD and Lie scales are shown in Table 2. Test-retest reliabilities, computed from data collected from 119 part-time MBA and undergraduate students of Youngstown State University, who filled out ROCI-II twice at an interval of one week, ranged between .60 and .83 ($p < .0001$).

Table 2
Scale Analyses

Scales of Conflict Styles	*Reliability*					*Social Desirability*	
	Test-Retest	*Cronbach Alpha*	*Spearman-Brown Reliability*	*Guttman Lambda*	*Kristof's Unbiased Reliability*	*SD*	*Lie*
Integrating	.83	.77	.73	.77	.77	.29	.14
Obliging	.81	.72	.71	.73	.72	.00	.01
Dominating	.76	.72	.71	.73	.72	−.09	−.05
Avoiding	.79	.75	.71	.76	.76	−.11	−.08
Compromising	.60	.72	.67	.73	.73	.06	.03

Internal consistency reliability estimates were satisfactory. Coefficient alphas ranged from $\alpha = .72$ to $\alpha = .77$.

The test-retest correlations and Cronbach alpha reliabilities compare quite favorably with those of the existing instruments. The test-retest correlations for the four existing instruments range between .14 and .57 for Blake-Mouton; .41 and .66 for Hall; .33 and .63 for Lawrence-Lorsch; and .61 and .68 for Thomas-Kilmann instruments. The Cronbach alpha for Hall, Lawrence-Lorsch, and Thomas-Kilmann instruments range between .39 and .73, .37 and .59, and .43 and .71, respectively (Thomas & Kilmann, 1978).

Social Desirability Response Set. Social desirability contamination was checked using the Personal Reaction Inventory (Crowne & Marlowe, 1960) and the Lie scale from the Eysenck Personality Inventory (Eysenck & Eysenck, 1968). Data on ROCI-II and these two questionnaires were collected from part-time MBA and undergraduate students of Youngstown State University.

There was a marginal but significant positive correlation between the social desirability (SD) and integrating scales ($r = .29$, $p < .001$, $N = 264$) and between the Lie and integrating scales ($r = .14$, $p < .05$, $N = 279$). Other conflict scales did not significantly correlate with the SD and Lie scales. The correlation between the SD and Lie scales was .46 ($p < .0001$, $N = 249$).

If SD becomes a serious problem in the measurement of conflict styles, it may be appropriate to control SD according to the procedures suggested by Eysenck and Eysenck (1968) or Smith (1967).

Discrimination of Known Groups. An attempt was made to check whether the five scales could discriminate among the three parties involved in conflict with an organizational member (respondent): boss, subordinates, and peers. As suggested by Hull and Nie (1981), a stepwise multiple discriminant analysis was performed on the total sample. The stepwise selection criterion used was Mahalanobis distance. In addition, the canonical discriminant functions were rotated, using varimax criterion and Kaiser's normalization, to improve their interpretation (Hull & Nie, 1981).

The discriminant analysis resulted in two significant canonical discriminant functions that discriminate among the three parties. The first discriminant function (chi-square = 246.00, $p < .0001$) has a positive coefficient for obliging (.97) and negative coefficients for integrating (-.21) and compromising (-.52). The coefficients of dominating and avoiding are negligible. The group with a positive centroid is boss (.45), and the groups with negative centroids are subordinates (-.18) and peers (-.34). Respondents were more obliging with their bosses and integrating and compromising with their subordinates and peers.

The second discriminant function (chi-square = 52.79, $p < .0001$) has positive coefficients for obliging (.28), dominating (.57), and compromising (.72) and negative coefficients for integrating (-.35) and avoiding (-.28). The groups with positive centroids are boss (.28) and peers (.09), and the group with a negative centroid is subordinates (-.45). These indicate that the respondents were obliging with their bosses and integrating with their subordinates on both functions. To a lesser extent, the organizational members were compromising and dominating with their bosses and peers. The functions correctly classified about 51 percent of the respondents into the three groups.

A second discriminant analysis was performed with the five scales as independent variables and sex as a dependent variable. As there were only 50 females in the sample, 50 males were randomly selected from the remaining sample and combined with the females for the analysis. The analysis resulted in a significant canonical discriminant function (chi-square = 14.79, $p < .01$). The centroids of males and females were -.40 and .40, respectively, and the discriminant coefficients were .32, -.41, .82, and .56 for the integrating, obliging, avoiding, and compromising scales, respectively. The dominating scale could not discriminate between the two groups. Females were more integrating, avoiding, and compromising and less obliging than males. The function correctly classified 62 percent of the respondents into the two groups.

Concluding Remarks

ROCI-II was developed to measure five styles of handling interpersonal conflict. Factor analyses of data from a national sample of executives clearly

reflect the five a priori dimensions of conflict styles. The test-retest and internal consistency reliability coefficients for the five scales are satisfactory and compare favorably with other existing instruments. The discriminant analyses provided evidence of empirical validity of the scales. Further, four of the scales are free from social desirability or response distortion bias. In future studies additional evidence of validity of the scales should be investigated. As it stands now, the scales can be used in basic research, teaching, and in the diagnosis of styles of handling interpersonal conflict among the members of an organization.

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